The Builder.

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The Causes of Bad Work.

THE opening chapter of one of the most remarkable of modern English novels contains an incident and a brief conversation which goes to the root of the subject which was discussed at the Architectural Association last week. Adam Bede, at work on a door in the carpenter's shop at which he was engaged, has his attention attracted by the sudden cessation of the sound of work all round him, and looking up for the reason, finds that the hour for leaving off work having struck, every man had thrown down his tool as if it burnt his hand; one man having flung away his hammer in the very act of lifting it. "Ah"! exclaims Adam contemptuously, "I can't abide to see men throw away their tools i' that way, the minute the clock begins to strike, as if they took no pleasure i' their work." The habit of mind in regard to one's work which roused Adam Bede's disgust is, we believe, at the bottom of three-fourths at least of that deterioration of workmanship which Mr. Owen Fleming commented on and deplored in the able and evidently sincere paper which formed the basis of the discussion at the Association meeting. The discontinuance to a great extent of the apprentice system, whereby a youth had the opportunity and encouragement to become thoroughly conversant with the practical details of his trade, and was compelled to stick at it as a learner for an extent of time which gave him full opportunity for learning, is no doubt answerable to some extent for the decrease in the number of really competent hands in many trades. But we believe that what is at the bottom of that deterioration of workmanship which seems to be uncontested and incontestable, is the fact that under the influence of the new trades-unionism men are encouraged to regard it as the main object not to do their work as well as possible, but to get paid as much as possible for it. Professor Garnett, the first speaker in the discussion, evidently recognised this element as the most important one in the case, and, though specially concerned himself with technical education, went straight behind that to the moral question, how we are to educate boys to take a pride in their work and to think it a disgrace to do it badly. We may educate the boy to this, but it is difficult to see how a man is to have much chance of keeping it up afterwards, when he is taught by a trade-union to regard the obtaining a standard rate of wage as the main object of life; when he can be admitted to the trade-union without showing any proof of competency in his craft; when he is taught to regard a member of a union as a "respectable" workman, and one who is not a member, even though he is a better workman, as not respectable;* when he may work alongside a drunkard who is a unionist without derogation, but must regard a good workman who is a non-unionist as a discreditable companion; and when, if he is an exceptionally clever and industrious man, he will find that he is expected to curb his industry and his ability down to the average level of those around, and that he will be, to say the least, looked upon with distrust and suspicion if he does not. There is no subject on which trade-union leaders or officials are more touchy than in regard to this accusation; but with other evidence than theirs before us, we can only conclude that their resentment against it arises from an uneasy consciousness that it is too true. Alderman Taylor, we observe, indignantly disclaims any knowledge of any regulations tending to such a levelling down of workmanship, and asserts that "nothing of the kind had ever emanated from any of the trade-unions." Of course not; it would be the worst possible policy to give such a handle to adverse criticism as would be furnished by the existence of a definite order or instruction against working too fast or too well. But evidence that such an influence is exercised, indirectly and under the rose, by modern trade-unionism, reaches us not infrequently from one quarter or another; and it is one of those abuses of which it may be said that everybody knows of it though everybody interested in denying it denies it. Let us look at some of the evidence given by large employers of labour before the Labour Commission, and see what they think about it. Mr. Bird says in his evidence: "The action of trade-unionism is to fix not only the minimum but also the maximum of wage-earning, and the maximum of hours that a man may work. Therefore if a man is ever so industrious and ever so expert the trade-union would not allow him to exert his abilities and earn a penny more than his less industrious fellows." Mr. Bridgman, another witness, referring to the same subject, gave evidence as follows:—

"I say that the unionists do prevent the masters giving the man who is a superior workman more money for his superiority, for this reason, that they object to the man being a superior workman and doing more work than his neighbour; they contend that if he is a superior workman and so does more work in the day, he to a certain extent is depriving that other workman of the extra amount of work which he does, therefore you cannot pay the superior workman for his superiority, that is, you cannot pay him for the extra quantity of work which he does, and therefore you level them all down to one level. Of course they fix the standard of wage."

We may next direct attention to the following extracts from Mr. Bird's evidence:—

"Men do a great deal less work now than they ever did. Where it used to be the custom for a good bricklayer to lay a thousand bricks a day, 300 or 400 is about the usual thing now; the cost of labour has increased from 40s. a rod, which it was thirty-five years ago, to 80s. or 90s. now.

32,197. Do you mean to say that that is due to the increase of wages per hour, or to the diminished work done by the workmen, or both?—Both.

32,198. You mean to say that a workman does not do as much in an hour now as he formerly did?—I say he does not do half. He does less than half now.

32,199. Do you mean to say, when you contract with a man to serve you, we will say at a given wage per hour, 8d. or 9d. an hour, he does not give you his best energies during that hour?—I say so distinctly, and I shall be borne out, I should think, by every builder in London.

32,200. You mean to say, instead of doing a regular fair hour's work, he does as little as he can? Yes.

32,201. That is rather a serious allegation?—Yes, very serious, and I make it with full knowledge of what I am saying."

The questions were put by Mr. Mundella, who did the greater part of the examination of witnesses in this portion of the evidence, and who appears to us to have examined with a very obvious advocate's bias on the side of the workman. Evidence to the same effect is given in regard to the joinery, only that here comparison is between work done before the days of machinery and work

* See evidence before the Royal Commission on Labour.

done with the aid of the modern joinery machines:—

"Now, with regard to joinery, we use machinery, and give the use of machinery, and we pay just as much for making a four-panel door as we did twenty-five years ago.

32,209.—Then, the joinery is the same, is it?—The joinery is the same, but we give the joiners the use of machinery, and I say that the labour costs just as much now as it did then, when the men had to cut the stuff out of the deal, strap it up, and square it up, and work it.

32,210.—That is a general statement?—It is; to our cost we know it."

It appears to be a favourite method, when it is desired to get rid of or to create a prejudice against a foreman who is too energetic, to raise a cry that he scamps the work, and this kind of charge is unblushingly got up, it would appear, by men who are themselves, on principle (if one may use the expression about so unprincipled a business), doing their work slackly in order to spin it out, and make the most they can out of it, and who do not scruple to pose as the virtuous advocates of honest workmanship. On this point the opinion of Mr. Burt as to the cause of a strike which took place at the Imperial Institute is worth noting. The ostensible reason for the strike was the subletting of the plasterers' work. Mr. Burt says:—

"We engaged a foreman, Thompson, at a weekly wage, to do such work as was not let by the architect. The work under his direction commenced in March. The plasterers struck against this foreman after the work had been in progress about a month. As at that time the joiners had just struck, we took no active steps to controvert the action of the plasterers, and they remained out for two months or more, when, having obtained a considerable number of joiners, the plasterers started again under a new foreman. Mr. Otley says that they struck because of piecework. We do not know really why they struck, except that they did not like the foreman, who made them do a day's work. The statement I have made will show that Answer 17,324 is directly opposed to the facts, as is also the assertion that Thompson, the foreman, was one of the biggest scampers in London. That was the charge made. He did work for us for a number of years, during which we did not have a single instance of his work having failed, or been found fault with. Answer 17,328 is not in accordance with the facts. The work was not sublet when the men struck. The men struck against Thompson because he insisted upon their doing a fair day's work."

We will give one more quotation from the evidence of the builders; the question was asked by Mr. Austin—

"Am I to understand from you, gentlemen, that the workmen in the building trades have deteriorated to that extent which you have mentioned, as compared with twenty years ago?—[Answer, by Mr. Wright.] The whole object, at the present day, *is to do as little work as possible.**

You say that they do not do as much work to-day as they did twenty years ago; is that the fact?—It is a fact. We find that the work costs us double now what it did twenty years ago."

Such is the experience of the employers of building labour at the present day; and it certainly affords a significant commentary on the claims of the labour representatives, that they are all in favour of excellence of workmanship. Still more significant, perhaps, is the evidence of Mr. Bridgman, another member of the Central Association of Master Builders, as to the degree of interest which the trades-unions feel in securing excellence of workmanship—

"I bear out what the previous witnesses have said, that the trades-unions do not discriminate between the good workman and the bad workman. I have put this question myself to delegates from the Union, asking them if they can guarantee that the men belonging to their Union are examined and are good workmen, and they say that they cannot do so, and that they take anybody, but that we have the power, after we have employed a man or have engaged a man, to discover whether he is a good or bad workman, and we have the power of discharging him."

Just so; and then, as has actually been known (we are confident some of our readers can recall more than one instance), the other men will strike because the incapable or idle one has been turned off. However the trades-union leaders may evade the point, and declare that they have never formally given instructions to do work slackly, it is evident that it practically comes to that, and that the organisation of the unions is directed not to secure good work but to secure good pay. This latter is a perfectly justifiable end in itself, if there is an equal desire that the work should be well done; but the policy of combination to secure good wages entirely irrespective of good work is one of the meanest and most contemptible policies that any class of men could espouse; and we say that, on the evidence before us, that is the policy pursued by the new trades-unionism. If they wish their good intentions to be credited, let them proceed at once to alter all that; let them teach their members that the first and highest duty, and what ought to be the highest pride, of men engaged in any work whatsoever, is to do their work as well and as efficiently as possible, and that only when that condition is fulfilled have they a moral right to agitate for the best pay possible. When that position is fairly taken up and professed, then we may be ready to believe in their professions of anxiety for the improvement of workmanship—and not till then.

That this organised indifference, as it may be called, as to the paramount duty of doing one's work as well as possible, is responsible for a great deal of the bad work that is done, we are thoroughly convinced. But at the same time we quite concur with the remark of Alderman Taylor that the workman must not bear the whole brunt; that if there are bad workmen, there are also bad architects and bad builders; though in regard to these again we are inclined to think that a good deal of the fault lies not so much with individuals as with a system. We have before expressed the opinion that for a great deal of bad architecture and bad building in the present day the commercial system of rapid building for the sake of quick returns is responsible. It is impossible that good architecture can be designed in a hurry and against time, and it is exceedingly difficult to carry out good building under those circumstances; while in regard to the builders we have also to take into account the baneful effect of this hurried building, and of the competition for low prices, on the execution of the work. In the present day, with regard at all events to all buildings which are erected with a view to a commercial return, quantities are everything, and it is probable that in many cases the nominal "builder" hardly sees the drawings at all—certainly has not time to study them; he estimates on the quantities merely, and has to cut down his prices as close as he can to have a reasonable chance of obtaining the work. If the public want this they must have it; but it is not the way to secure either sound building or good architectural design. In regard to the architects one important point is touched on in Mr. Fleming's paper, and returned to by Mr. Verdon in the discussion, viz., that architects are in the present day far less in touch with the working man than formerly. Mr. Verdon says that it often occurs that a workman engaged on a building knows of something which the architect ought to know about, "but the architect would be very chary of speaking to the workman." If that means that the architect would think it beneath him to discuss a matter with a man working on his building, or hear what practical suggestion the workman had to make, we should think such architect a fool for his pains, or his false pride. We cannot say that we have encountered that sort of architect; we have no doubt he exists; those whom we have known most about would think it both a pleasure and an interest to hear what a good workman had to suggest about the work he was engaged upon, and would have sense enough to know that they might very probably get something useful from him (unless he were a new-school unionist, thinking more of his pay than his work).

Granting that the higher moral standard in the workman, which Professor Garnett desires, were established, we should still have before us the question of his technical training. Most people who have given any thought to the subject seem to be of opinion that, however we may regret the decay of the apprentice system, we are not likely now to see it revived to any great extent. To supply its place we must have technical training, and in regard to this the suggestion of Professor Garnett deserves serious consideration; that the technical training, to be of the best effect, ought to be given in connection with each trade, and not as a theoretical training apart from the trade, a kind of preparation for taking up handicrafts generally. For one thing, it does not appear that youths who intend going into handicrafts take kindly to abstract or theoretical training in geometry, mathematics, &c.; very naturally, they do not see the immediate connexion between this and the business of learning a handicraft and making a living. Teach them the theory along with the craft; as Professor Garnett puts it, bring the class into the shop or the shop into the class, and there would be much more interest taken in the theoretic training, because its practical application could be demonstrated on the spot; and moreover the learners would be caught by the theoretic teaching in the middle of their handicraft work, instead of having to make a special excursion to seek for it. This suggestion seems to us one of the most valuable which was thrown out in the discussion at the Association.

One other point we may allude to; the testimony borne by Mr. Fleming—a testimony which we did not require, but which he was quite right in accentuating—as to the really practical result of the efforts of the Plumbers' Company to improve the standard of knowledge and of work in their trade. There is no doubt that the effects of their efforts are real and important; and what they have been able to do other companies could do for their respective trades, if they went to work in the same spirit and with the same energy.

THE FLUSHING CISTERN QUESTION.

We have already, in last week's report of the proceedings of the London County Council, quoted the recommendations made by the Public Health and Housing Committee as to the quantity of water which should be required to be provided in flushing cisterns for water-closets, and including the recommendation that the maximum of "two gallons" at present prescribed, by the Local Government Board, for the London districts, should be altered to "three gallons." Since then we have received a copy of the report of the Special Committee of the Sanitary Institute appointed to inquire into and experiment upon the action of various charges of water in clearing water-closets and drains. This report was communicated to the County Council, and is, we may probably assume, the real basis of the report of the Public Health and Housing Committee, but it gives much more detailed information than was included in the latter report.

The special experiments for the purpose were carried out as follows (we quote from the report of the Sanitary Institute Committee):—

"A series of drains was laid 50 ft. in length, partly pipes and partly half-pipes or open channels, of the following sizes and gradients:—

4 in. .....1 in 30	6 in. .....1 in 30
,, ...1 ,, 40	,, ...1 ,, 40
,, ...1 ,, 75	

At the head of each drain was fitted a simple short hopper basin of a good type, with an "S" trap having a 2-inch seal, leading with a bend into the drain, the top of the closet basin being 2 ft. 3 in. above the drain. A good syphon waste preventer, discharging two gallons in 5 seconds and three gallons in 7 seconds, was placed 4 ft. 3 in. above the closet basin, and connected to the basin with a 1½ in. flush-pipe, care being taken that there should be a clear waterway of this diameter from the cistern to the basin; at the lower end of each drain a disconnecting trap was fixed—two different forms of trap in ordinary use were employed to each gradient. Six hundred

* The italics are ours

experiments were made in this series. Tables A and B and diagrams A and B show the results of these experiments, first with a two-gallon-flush, secondly with a two-and-a-half-gallon flush, and thirdly with a three-gallon-flush, the quantity of water in each case being carefully measured.

A further series of drains was laid 26 ft. long, partly pipes, and partly open channels, of the following sizes and gradients:—

4 in..... 1 in 40 | 6 in.....1 in 40

The same closet and waste preventer were used, and the experiments were conducted, as in the longer drains, with two different forms of trap, 240 experiments being tried.

From this description it will be observed that these experiments have been conducted under certain conditions only, with respect to water-closet, flush pipe, application of flush, and gradient of drain. Time has not sufficed to extend the experiments beyond the scope so far adopted, but the Committee think that further experiments on a more extended scale would be of service in elucidating the entire question.

The method of conducting the experiments was to place in the basin three lumps of artificial excreta (a mixture of soft soap, cocoa fibre, and clay) and five pieces of paper (newspaper). The contents of the flushing-cistern were then discharged, noting in each case how much material was left in the closet trap, how much in the drain, how much in the disconnecting trap, and how much passed through. All the materials were removed before the next experiment.

With reference to the materials used in the experiments, it should be observed that they would be more easily flushed out than actual healthy excretal matter."

The results of the experiments are stated as a general average, but are further illustrated in a series of tables appended to the report, giving the results in diagram form, as well as illustrations of the apparatus employed in the experiments. These ought to be studied by those who are concerned in sanitation; some of the results are rather startling. It appears that with a two-gallon flush, with a good type of short hopper closet, an average of 5 per cent. of the material is left in the trap, while with a three-gallon flush the trap is practically cleared, the retention being only 1 per cent. In regard to the drains the results are even more important to notice. More than once we have drawn attention to the fact that it is not only the cleansing of the closet basin and trap that is to be looked to, but the cleansing of the house drain and the adequate carriage of matter to the sewer. The experiments of the Sanitary Institute Committee show that with a two-gallon flush an average of 21 per cent. of the matter in the closet basin is retained in the drain-pipe, for the time; of course it will be cleared out more or less by subsequent flushes, bringing however fresh matter down to supply its place, and ensuring a permanently foul condition of the house drain. When it is remembered that in London a large majority of the house drains necessarily and unavoidably run under the houses, it will be recognised what a serious matter this is. The experiments further showed that with a three-gallon flush only 3 per cent. of matter is left in the drain. It is to be hoped that these plain facts, brought out by a series of experiments conducted under the management of competent experts, will render it impossible for the London water companies (or some of them) any longer to assume the attitude of imposing upon their customers a limitation of the water-supply for closets which has now been shown, on unimpeachable evidence, to cause foul traps and foul drains. No one who understood anything of the subject could have any doubt of this, but the facts are now to be had in black and white in the Sanitary Institute report; and in the face of that report we repeat with the more emphasis the advice we have before given to householders, not to pay any attention to the demands of water companies to restrict themselves to two-gallon flushing cisterns. By doing so they are creating a sanitary danger, and it seems to us impossible that any Court could support the demands of the water companies in the face of such a report as this, as it is equally impossible that the law on the subject can be allowed any longer to stand.

We may observe that the recommendations of the Sanitary Institute committee go farther than those of the London County Council. They recommend that a *minimum* of three gallons should be fixed, so as to compel all householders to use an adequate quantity of water, and that to prevent waste of water it should be limited to a maximum of 3½ gallons. We should have preferred four, as a safer margin, but we hope that at least the recommendations of this committee may be speedily acted on by the Local Government Board, which will fail in its duty to the public if it delays taking action on a matter so important to public health in crowded cities.

NOTES.

THE betterment question came before the House of Commons on Monday last, on a motion for the adjournment of the House, made by Sir John Lubbock, the practical object of which was to make a protest against the action of the Government in refusing to join in a Joint Committee with the House of Lords on this subject, and to urge a reconsideration of the position. At present the Government will not give way, and between their obstinacy and the childish pique of the County Council, London is likely to have none of its necessary improvements carried out. For it must be clearly understood that the raising of some part of the required funds by means of a betterment rate is not absolutely necessary in order to carry out these improvements. Even if we assume that such a rate is desirable, that is no reason why London improvements should be at a standstill because such a rate cannot yet be levied. The County Council can raise all the necessary money in the ordinary way, and they should do so, endeavouring meanwhile to obtain a legislative sanction for the principle of a betterment rate. We believe that the best course would be the appointment of a competent and impartial Royal Commission to inquire into the subject and to report whether such a rate is desirable, and, if it is, how it can be worked out in practice. As the Duke of Argyll points out in the correspondence on the subject, if a property is improved it pays a higher rate in consequence, because its rateable value is sooner or later raised. But if a property is to be loaded with a betterment rate, must not its rateable value be kept from being raised in consequence of the improvements? In other words, a property must not be twice rated for the same thing. Meanwhile the deadlock continues, and the most practical step is for Londoners to assemble in public meeting and urge on the County Council to go on with improvements whether a betterment rate is allowed or not.

THE Bath Town Council seem in the way to add another to the list of mismanaged and discreditable competitions, in the case of the designs for the Pump-room extension. After declaring loudly that this was to be a competition conducted on the most straightforward lines, they are now apparently desirous to adopt the design which was placed second by the assessor, which was sent in irregularly (the envelope containing no name or address) and which it seems to be now generally known is the work of their own Surveyor, whose duty it had been to draw up the instructions for competitors, and who by all rules of honour ought to have stood aloof from the competition. It seems to be disputed whether Major Davis, the Surveyor, was or was not formally instructed that he was debarred from competing; it is perfectly certain that if he was not so instructed he ought to have been, and that if the Council intended to allow him to compete they were playing false with the other competitors; and it is equally certain that it was the duty of any honourable man to have recognised that under such circumstances he had no right to compete. The ex-Mayor of Bath, Mr. Murch, in a letter on the subject written in a very proper spirit, asked very pointedly whether Major Davis, as a member of an honourable profession, could possibly value success obtained in this way. As to the action of the Council in retaining the right to make their own choice from among the three designs placed first by Mr. Waterhouse, we see nothing to blame in the abstract. We have always maintained that it cannot be expected that the people who are going to pay for a building should give up all choice about it absolutely to any assessor, however eminent, unless the assessor has made that a condition of acting, which does not appear to have been the case here. In the majority of cases sensible men would recognise that they would probably be doing best for themselves in following the assessor's advice; they would probably be doing so in this case; but we do not blame them, on principle, for reserving a right of choice. But under the circumstances under which the second design appears to have been sent in, and under which the Council seem disposed to insist on its adoption, the matter is discreditable both to the Council and their Surveyor.

THOUGH expressed in language somewhat unnecessarily wordy and florid, Sir Frederic Leighton's estimate of German Mediæval architecture, included in his address to the Royal Academy students last Saturday, is a very sound and judicious piece of criticism. It is, to be sure, pretty much what Fergusson, in much simpler language, has said already, but we presume Royal Academy students (unless the architectural ones are an exception) do not read Fergusson, and therefore it is as well that they should have had a just view of the weaknesses and defects of German architecture, not ignoring its merits, from their President.

THE students' designs exhibited to the public this week at the Royal Academy rooms are above the average in one or two departments, and perhaps rather below it in others. The designs for historical painting —"Joseph Interpreting Pharaoh's Dream" —are perhaps rather above the average, though there is no doubt that the painting by Mr. Speed, to which the gold medal has been awarded, is far in advance of the rest, and is a picture of great promise. Among the other designs No. 6 is clever and spirited, though rather stagey, the common fault of young artists in paintings of this class. The landscape-paintings for the Creswick and Turner prizes are at least quite up to the average; the greens seem to be the great difficulty. In these two competitions the prize has been gained by the same man, Mr. Harold Waite, who in each case is decidedly superior to all the other competitors, and of whom we ought to hear more in the future. The subject for the Turner Prize was "Moonrise before Sunset," a difficult subject in the way of lighting. No. 30, with a pale moon rising over a river, is a meritorious one; still more so, perhaps, No. 32, a scene in an inland harbour; Nos. 35 and 38 also deserve mention. The decorative designs—"design for the decoration of a public building"—are not as good as they sometimes are, and the one by Mr. J. B. Liston Shaw, to which the prize is awarded, though perhaps the best drawn as far as the figures go, is not interesting in subject, and not very decorative in effect; in a decorative sense No. 109 is better both in line and colour, though marred by the mistake of introducing a strongly-marked mosaic floor design in perspective in the foreground, which of course interferes with the "one-plane" effect proper to decorative painting. In the principal sculpture subject, "The taking down of St. Sebastian after Martyrdom," the gold medal has been given to a very weak design, certainly inferior to its neighbour, No. 176.

We have heard the explanation suggested that while the painters, who are in a large majority in the Academy, know absolutely nothing about architecture, and therefore seek the advice of an architect member in regard to the architectural prizes, they consider that they understand sculpture, and make the award irrespective of the sculptors. In architecture the gold medal has been given to the only design which has any claim to it, that by Mr. J. S. Stewart —subject, a provincial town hall; the other designs are nowhere. Among the designs done as classwork at the Academy are some good things, considering the circumstances under which they were done; several of the sketch designs for market halls are good, particularly No. 219; the 25*l.* prize is given to Mr. C. W. Baker for a very good "design for a morning chapel." Among the attractions of the collection are the English travelling student's sketches of last year, by Mr. Stewart, the winner of the gold medal this year; and the very fine set of sketches, chiefly of Greek and Renaissance work, by Mr. Hart, the winner of the gold medal and travelling studentship in 1891. Some measured drawings of Newgate, by Mr. G. J. J. Lacey, which gained the first silver medal, are well executed, and of interest as representing a historical building which will probably soon be destroyed.

THE Prussian Royal Academy has decided on having a special exhibition of works by its members and honorary associates. Herr Wallot, the architect of the new Imperial Houses of Parliament, has been entrusted with the arrangement of the show, which is to be open during the Christmas holidays, and he has had a suite of rooms specially arranged for this purpose in the old Academy buildings at Berlin. Practically all the members will be represented by their best works, which are being brought together with much difficulty. English art will be represented by works of Sir Frederick Leighton, Sir John Millais, Mr. Alma Tadema, Mr. Herkomer, and Mr. Ouless. As there are several architects among the members and foreign associates, there will also be a small architectural exhibit, principally, however, of German work.

IN the current number of the Athenian *Mittheilungen*, Dr. Körte has a paper on the recently-excavated shrine of Asklepios between the Pnyx and the Acropolis. This shrine, it will be remembered, was found quite unexpectedly during the excavations in search of the Enneakrunos. Dr. Körte gives a plan of the whole precinct, which consisted of an irregular quadrangle space of about 17 inches length by 13 broad. The entrance was at the N.-W. corner, where the main carriage road to the Acropolis intersected a more direct pathway for foot passengers. Within this space were found the foundations of a small shrine, with the lower portion of a sacrificial table still *in situ*, a huge stone forming the mouth of a well, the bases still *in situ* of many votive reliefs, and a number of reliefs, one of which bore a dedication to Asklepios himself. The most remarkable of these reliefs are published in the present article—one, of quite unique type, represents a bearded man holding in front of him a colossal leg, on which is depicted in salient relief a very obviously varicose vein. The relief was probably dedicated by a successful physician. The remainder of the reliefs follow the already familiar type, *i.e.*, processions of worshippers approaching the god, and facsimiles of portions of the body healed. The most interesting part of the discovery is that from the early character of the masonry it is clear that the shrine was in existence long before the worship of the canonical god of healing, Asklepios, was introduced at Athens. It therefore took its rise from the worship of some earlier local "medical man." The same number of the *Mittheilungen* contains a paper with a full discussion of the composition of the Gjölbaschi frieze.

WE hear that the experiment of setting apart a special room for architecture at the Exhibition of the Glasgow Institute of Fine Arts last year proved a complete success, and a committee has been formed to carry out the same scheme this year, in the hope of having an even better collection than last year. Circulars have been sent round to a number of leading architects asking their co-operation. One advantage for architectural drawings in the case of the Glasgow Exhibition is that the architectural room is not, as at the Royal Academy, a *cul-de-sac*, which visitors hostile to architectural drawings can avoid altogether. Drawings are to be sent in on January 10. Mr. Alexander N. Paterson, of 136, Wellington-street, Glasgow, is the Hon. Secretary for the architectural committee.

WE have received some particulars also in regard to an Exhibition to be held at Glasgow in the months of July, August, and September of next year, under the title of "Old Glasgow." This is to be a kind of historical exhibition, including views and plans of the city in past times; old books newspapers, proclamations, &c.; spinning machinery, ship models, early Clyde steamboats; old charters, banners, and insignia; regalia, plate, and weapons, personal ornaments, and other such memorials. There ought to be a great deal of interest in such an exhibition, considering the important position which Glasgow has so long held as a city.

IN our article last week on "Stone Statistics" we complained that no reliable figures respecting the output of stone from open quarries appeared in the annual Blue-book on "Mineral Statistics." We further showed that this was largely due to the circumstance that open quarries are not included in the operations of the "Coal Mines Regulation Act," nor the "Metalliferous Mines Regulation Act." There now seems to be some prospect of more detailed information on the subject. We learn that the Departmental Committee, appointed a short time since by the Home Secretary to inquire into the conditions under which the quarrying of stone, &c., is conducted, with the object of diminishing any proved dangers to the life or health of the workpeople engaged, has reported in favour of placing open quarries in the same category as metalliferous mines, and making the inspection of such workings a part of the duties of the District Mining Inspecior. The Committee states that the percentage of accidents in quarries is extremely high, and is of opinion that remedial measures should at once be taken. It is suggested that, as a commencement, all quarries should be placed upon the same footing. It is certainly high time that something was done, but we fear that the love of danger, so characteristic of quarrymen in general, will never be stamped out by Act of Parliament; the majority of accidents are clearly traceable to the men's own foolhardiness. Only the other day, on visiting a quarry in the Sherborne district, where rough road metal is blasted, we discovered, on inquiry, that the powder used was ordinarily kept in a lime-kiln, and within 5 ft. of the furnace doors! On another occasion, when witnessing some stone-blasting experiments in North Wales, the fuse used was so short and burnt so quickly, that there was barely time to clamber up the sides of the quarry out of the way, before the explosion occurred, and large pieces of the stone fell within a few feet of us. The ladders and ways down to hole-quarries are generally of the most rudimentary description, and often dangerous. We have occasionally seen a man with powder and fuse under his arm, smoking a short clay pipe; and all directions as to tamping when the charge is in the hole are frequently set at defiance. The cool manner in which quarrymen will proceed with their work when a steam-crane is lifting heavy stones over their heads is astonishing. A huge mass of overhanging rock has no terrors for them. They seem quite oblivious of danger; and more sober minds must therefore devise methods to prevent them from running needless risks. If the report of the Departmental Committee is instrumental in minimising these dangers it will have done very useful work; at any rate it cannot fail to be the means of furnishing more accurate information concerning open quarries.

IT must be confessed that persons often seem to go to law upon questions as to which there ought to be no kind of doubt. Thus, in the recent case of Haynes *v.* King, the rights of the matter appear to be quite clear. The plaintiff was lessee under the Ecclesiastical Commissioners, and in the lease was a stipulation that, "notwithstanding anything herein contained, the lessors shall have power, without obtaining any consent from, or making any compensation to the lessee, to deal as they may think fit with any of the premises adjoining, and to erect, or suffer to be erected, on such adjoining premises, any buildings whatsoever, whether such buildings shall or shall not affect or diminish the light or air . . . &c., enjoyed by the lessee." On the other side of the street in which the plaintiff's houses stood, and opposite to them, were four other houses, also the property of the Commissioners; and these houses were pulled down by the defendant, under an agreement with the Commissioners, and new ones were being erected by him which, it was admitted, would interfere with the plaintiff's light, and the question arose whether such interference was legal. We cannot understand how any doubt could have arisen, for, as Mr. Justice North said, "this is an express provision that the enjoyment of light by the lessee is to exist only until the lessors shall require to exercise the right expressly given to them by the contract." The plaintiff may not have understood the effect of the proviso, but to ordinary minds it is plain enough.

THE collection of pictures at Mr. Maclean's gallery in the Haymarket includes a fine replica, on a smaller scale, of Mr. Orchardson's picture "The Young Duke," which will be remembered a few years ago at the Royal Academy. In colour the repetition is perhaps superior to the larger painting. Among the water-colours are some interesting studies by Landseer, Holland, Wm. Müller, Mr. Alma Tadema, Mr. Thos. Collier, and others.

A COLLECTION of water-colour drawings by Mr. Weedon, at the Fine Art Society's gallery, consists of sketches in Sussex, Hampshire, and Scotland, not remarkable for very high artistic power, but showing a broad water-colour style, and a fine treatment of landscape composition in several instances. We may notice especially "Rye Marshes" (28) and "Downs above Chichester" (41); the latter a charming work.

WE are frequently under the impression that we have come across the most unreasonable possible specimen of the demands that are made on competing architects, but there always comes another behind to beat the record. The committee for the new Sandown Conservative Club competition seem to have achieved this. The club is to cost 1,000*l.* (a sum which, by the way, looks as if Conservatism was not in a very flourishing state at Sandown); the plans are to be drawn to working-drawing scale of eight feet to an inch; the architect whose design is accepted is to have the magnificent sum of five guineas, and the next in order of merit two guineas. "The

plans obtaining the first prize are to remain the absolute property of the club, no guarantee being given to employ the architect of the selected designs." Such is the simple statement issued to competitors. What sort of "architect" does the committee expect to attract by such a bait?

WE have received at the last moment, and too late to print, a very long letter from Mr. Howard Smith, the Corporation Surveyor of Carlisle, on the subject of Tullie House; which however is little more than a lengthened setting-out of the fact, which is not disputed, that the working drawings for the building were made in his office, and the erection of it supervised by him. There are only two new facts in the letter, and one of them is of no consequence. One is that he sent to Mr. Ferguson a sketch for the Castle-street front, and that it does not differ very much from the one designed by Mr. Ferguson. There is a good deal of similarity, though the difference is that between a surveyor's design and an architect's, as far as details are concerned; but as Mr. Howard Smith goes on to say that he never wished to claim credit for the Castle-street front (the only part of the design, apparently, for which he might have made some claim as to origination), there is no more to be said about that. His other correction is that the illustrations in the *Carlisle Journal* are not "taken from the finished building," as we concluded, but from sketches which he made two years ago. These are simply the elevations of Mr. Ferguson's "plan B," which are now at our office, put into perspective, with some unimportant variations, and the plan is nearly identical with Mr. Ferguson's plan. Mr. Howard Smith states that his letter is intended as a justification of the statement that "the plans and drawings for the alterations and additions to Tullie House were prepared by the City Surveyor." No one has disputed that they were—from Mr. Ferguson's original design. That is the point which has been omitted, and that is just the important one. We have the whole evidence before us, and our view of the matter has been confirmed by two other independent correspondents.

THE ARCHITECTURAL ASSOCIATION

London Workmen: their Education and Workmanship.

THE ordinary fortnightly meeting of this Association was held on the 8th inst. in the Meeting Room of the Royal Institute of British Architects, No. 9, Conduit-street, Regent-street, the President, Mr. E. W. Mountford, in the chair.

The minutes of the previous meeting having been read and confirmed, the following gentlemen were elected members of the Association:—Messrs. R. E. Dennis, T. H. Russell, J. Bennett, and A. Bryer.

The President said that owing to the indisposition of Mr. Owen Fleming, who, although present, had attended that evening at great personal risk, the senior Hon. Sec., Mr. F. T. W. Goldsmith, would read Mr. Fleming's paper on "London Workmen: their Education and Workmanship."

Mr. Goldsmith then read the paper, which was as follows:—

The decision of the Architectural Association to set apart a day for the consideration of modern workmanship should be a matter for sincere congratulation on the part of all those who have the great question of good building at heart. The discussion appears to be peculiarly suited to this Association, for it has by its recent energetic and thorough reorganisation of the education of young architects shown that it appreciates the lines upon which large schemes of teaching organisation should be framed, and that, if it considers a certain course to be necessary, it is not deterred from undertaking that course by its magnitude or apparent difficulties.

The ultimate object of all architects is to obtain thoroughly good building. Our very motto proves this. We are now daily engaged in showing those studying our art how to design in beauty. What will be the practical result of our labours if we are not able to complete our task by obtaining buildings built in truth? It may be urged that the responsibility of architects ceases with the education of themselves. Surely this is a narrow and indefensible position to take up. If architects fail to assert their rightful position as arbiters and leaders of workmanship, it is but reasonable to assume that others will fill their places, and it is a serious question whether any persons are as qualified to direct workmanship as those whose lives are devoted to a study of the question. If historical precedent is of any value, our existing knowledge leads us to suppose that the architects of the great Classic and Mediæval monuments which command our admiration and respect were in far closer touch with the workmen than we architects are to-day. The present position is mischievous in many ways. The architect, for example, is the person who creates in his mind the ideal building. He shows the nature of that building by his drawings, and describes its method of construction by his specification. But the actual realisation of his ideal must necessarily be the task of others, and the success of his work is frequently sadly marred by the carelessness or incapacity of the operatives. Criticisms of workmanship are now so frequent that they are almost regarded as commonplaces in most of our professional assemblies, and this is the reason why I am asking the honour of your close attention this evening.

It seems almost unnecessary to submit to an audience of professional men any extensive evidences of the way in which the average modern operative performs his duties, but we have the advantage of the presence with us to-night of representatives of the various Trade-Unions and others interested in this question, and I propose therefore to deal with this portion of the subject more fully than I otherwise would have done. I do not wish to say that there are not a large number of thoroughly efficient and earnest workmen to be obtained at the present time. I would not even assert that workmanship has deteriorated materially during the last decade; but speaking of the capacity of the average building mechanic in London, I feel I am but the mouthpiece of my professional colleagues when I state that his work is very far below the standard it ought to reach. Let me ask the Operative Bricklayers' representative whether even 25 per cent. of the men who present themselves on a job are capable of executing a piece of good face brick-work. Even among these comparatively capable men, how many are able or willing to do a piece of really first-class work without constant supervision. Perpends are not truly kept. The headers are not central over the stretchers. The joints are of uneven thickness. Bricks chipped and with angles knocked off are built in without thought. Care is not taken that the best face shows outside. Even with interior work, it is most difficult to get the work done properly. The average bricklayer seems to imagine that there is no necessity for the sides of bricks to be covered with mortar. A little scrap of mortar on the front edge, and some thrown into the joint from above when the brick is laid, is supposed to be sufficient to make a good joint, and the architect who ventures to ask for this system to be altered does not meet with a cordial reception. I came across a man the other day who had built a wall so carelessly that you could not tell the difference between a heading and a stretching course, and yet even this man was a member of the Operative Bricklayers' Society. An architect told me that he had to employ five men before he could get some salt-glazed brickwork decently executed. With regard to joiners, I fully recognise the difficulties under which the modern joiner does his work, but even on this basis, capable joiners are as difficult to find as capable bricklayers. The shop foreman of one of the largest London contractors told me that he only accepted one out of every four men who applied to him for work. The others were not able even to put together machine-made joinery to his satisfaction. To obtain a joiner able to intelligently set out full-sized rods is a matter of great difficulty, and we are, alas! too familiar with ill-fitting joints, badly-mitred mouldings, badly-fitting doors and windows. The joiners' show at the recent Workmen's Exhibition at Islington appeared to me very unworthy of the trade. Compare the joinery of an average suburban house of to-day with that of the Queen Anne and early Georgian houses of the same position, and see if the two will really bear comparison. I cannot deal with all the trades, but on all sides we find evidences of want of knowledge or want of care. The only trade where we find any evidence of progress is the plumbers', where the average quality of the work is distinctly high, but this is probably owing to the energetic policy of the Plumbers' Company. When we turn to the higher branches of the trades we find the same lamentable story. An hour's walk through the principal streets of London is the best way to arrive at a conclusion on this point, and the work of the average brick-carver, stone-carver—and to a less extent the workers in metal and plaster, must be held to compare most unfavourably with the exquisite work that prevailed in the sixteenth and seventeenth centuries.

There is not even the excuse of great rapidity of work to offer. Work is really done at a much slower rate than it used to be. Several contractors have assured me that the price of labour to-day is 40 per cent. or 50 per cent. higher than it used to be, owing principally to the length of time men take in their work, and I have strong evidence to show that bricklayers are practically compelled not to lay more than an average of 400 to 500 bricks per day, whereas ten years ago the average per man was nearer 1,000. A comparison of priced bills of quantities of the present day with those of fifteen years ago is an instructive operation. I am not complaining of this slow progress of work. That, regarded on its merits, may or may not be desirable. I only refer to it to show that men have plenty of time to do their work properly if they can and will.

This state of affairs seemed to me so serious that I have taken great pains to verify my own experiences by conversations with all classes of workmen, foremen, and others engaged on buildings, and I am prepared if necessary to give other evidences of the unsatisfactory character of modern workmanship. If, therefore, the view of the matter I have presented is accurate, I submit that some definite steps should be taken, and I therefore propose at the close of this discussion to ask this Association to appoint a Special Committee to investigate the matter from the architect's point of view, and to see in what way the collective influence of architects can be brought to bear upon the artificers of London. I entirely refuse to believe that any large body of men following an honourable calling would knowingly or willingly practice that calling in a slip-shod or inefficient manner. Mr. Llewellyn Smith, in his most able and exhaustive report upon technical education in London, tells us that the workmen "are now keenly alive to the evil of the present state of things," and if this view be correct, I can imagine that architects, who are by their position, uninfluenced by political and economic considerations and whose only object is to secure good work, will be able to exert a wonderful influence towards the levelling-up of workmanship. The fault is not the workman's, but the difficulties which beset his path while he was being trained.

Let us consider for a moment the question of apprenticeship. For many years past this has been steadily declining in London, and now it may be said to be practically dead. In some trades, we learn, it is replaced by a sort of quasi-apprenticeship, but in the majority of the building trades nothing has taken its place. Boys are taken as errand boys, and have to pick up the work as best they can. I am informed by persons whose knowledge of this question is great, that the average native London bricklayer begins as an odd boy, becomes a labourer, gets on to some speculating work in the suburbs, picks up some rough notion of bricklaying there, drifts back into the metropolis, and offers himself as a competent bricklayer, and on cross-examining two or three groups of bricklayers I concluded that there was much truth in this assertion. Many of the best mechanics working in London are, however, not Londoners at all. I have evidence of a convincing nature to show this, and in some cases the proportion of countrymen is fixed as high as 75 per cent. This is a statement which must be a cause of grave concern to the London School Board and the newly-formed London Technical Education Board, for it shows that the London boy is apparently unable to obtain the information necessary for him to take his place as an efficient workman.

This conclusion is strikingly emphasised by some statistics prepared by M. Llewellyn Smith of the percentage of boys—not even apprentices, but only boys—to the total number employed in the different trades. We learn that among bricklayers the percentage in London is nine against twelve in the whole country, among carpenters eleven against sixteen, among masons ten against thirteen, among plumbers twenty-three against twenty-six, and among painters eight against thirteen. If the apprenticeship in the London building trades is dead or dying, it becomes a question of the highest moment as to what is to

take its place. Matters cannot remain in their present condition, or the present unfortunate condition of affairs will assume disastrous proportions.

It is impossible in any survey of this character to avoid a consideration of the trade-unions. These organisations, founded originally on an avowedly protective basis, now practically have become representative institutions, and in addressing them we may fairly be said to be addressing the workmen themselves. With the many economic questions that hover round trade-unions I have nothing to do. My object in referring to them is to indicate the enormous influence they might exercise on the question of workmanship if they chose. I have been told over and over again that trade-unions are not formed to deal with workmanship, but I submit that it is to their interest to take up this question. In fact, I hardly see how they can escape it if they wished to do so. I do not know by what restriction the entrance to these societies is fenced about, but I imagine that some steps are, at all events, supposed to be taken to see that men entering their ranks have a right to do so, and, once admitting the elementary principle of selection, it is not difficult to conceive that this entrance selection might be made of real and great value. Surely the competency of the individual concerns the societies who represent the trades quite as much as the competency of aspirants for membership concerns our own representative body, the Institute of Architects, and to allow half-educated men to "slide in"—to use the expression of a meeting of workmen with which I argued this question—is to seriously discredit the position of the trade-unions themselves. In many cases it is quite possible to fix the minimum amount of knowledge a man should have to entitle him to call himself a bricklayer or a joiner. We see an example of what may be done in this direction by the recent movement in favour of the examination and registration of plumbers. Not only is this test largly undertaken voluntarily, but the action of some of the provincial County Councils in determining that their work shall only be executed by registered plumbers is now being followed by the London County Council, and legislation is contemplated on the subject. I commend this line of thought to the Trade Union delegates here this evening.

One of the most encouraging signs of the times, which deserved far more attention from architects than it received, was the recent National Workmen's Exhibition at Islington. This exhibition was promoted by the London Trade Council. The object of the exhibition was officially declared to be, to exhibit individual handicrafts, to encourage skill and artistic taste in the worker, and to impart a desire to excel in the work undertaken. The idea of such a national competition as this, promoted by the men themselves, is altogether excellent, but the character of the majority of the exhibits in the building trades—again with the exception of the plumbers—jarred on my architectural feelings and showed me what an immense field for reform lay open if only architects and workmen would consent to work together in cordial and sympathetic co-operation.

Turning to the City Companies, I desire to offer the strongest testimony to the good work being done by the Plumbers' Company. I have found evidences of the influence of this Company in most unexpected quarters. I do not know on what lines this Company frames its policy, except so far as the presence of workmen on its Registration Committee discloses it, but it is doing very real good, not so much by a lavish expenditure of money, but by exercising a far-reaching influence over the trade as a whole with an admirable result. Another Company which displays great activity is the Carpenters' Company, although their influence on the trade, as a whole, is not very apparent. I have tried to discern the cause, and I would venture to ask those guiding the policy of this Company, whether the advantages of the high theoretical standard that they maintain does not tend to divert their attention from the main question before them, into channels not directly bearing upon the improvement of the ordinary carpenter and joiner. Other Companies that are free from the reproach of doing nothing in this direction are the Joiners', Painters', Plasterers', Tylers' and Bricklayers', and Blacksmiths'. I am sorry not to be able to include the Masons', and as to the Paviors', I have no information.

But however great the influence of these Unions, Exhibitions, and Companies may be, they can after all only encourage the production of good workmen, they cannot themselves produce them. This can only be done by definite teaching, and as the revival of apprenticeship seems at least improbable, we must look for organised technical instruction in another direction, viz., the technical classes rapidly springing up around us. I cannot pretend to deal with individual institutions to-night, with one exception, the Shoreditch Municipal Technical School. This is the first instance of which I am aware in which a metropolitan governing body has itself established and maintained a technical school, and its striking success during the short time it has been established is a testimony to the need of such an institution. A municipal school of this nature has many advantages over private institutions, as it is more in touch with those for whom it is founded. If it is strongly felt, for example, that the teaching is unpractical, the complaint can be brought before the member representing the complainant, who would be able to investigate the matter. I am informed that the establishment of this municipal school has not entailed any charge upon the rates.

Dealing, however, with the technical classes as a whole, I am afraid that their present influence on the question under discussion is of quite an unimportant character. The following statistics published last year are instructive:—98 carpenters were learning theoretical carpentry at the different London classes, and 65 were learning practical carpentry; 51 bricklayers took up theoretical, and 42 practical bricklaying; 33 masons were learning masonry; 341 plumbers were studying theoretical, and 247 practical plumbing; while 40 painters took up house decoration. The significance of these figures becomes fully apparent, when we realise that there are 136,000 men and boys employed in the Building Trades in London. Probably this year these figures would be greater, but it is evident that these classes as a whole, from some cause or other, do not attract the average boy. Whether prejudice is to blame, or want of funds, or insufficient advertisement or unpractical teaching I cannot say. Each particular class requires to be considered on its merits, and possibly the different causes I have indicated may, with others, be found operating in different degrees, according as the class is organised and managed. There is, however, a vast field of work urgently needing, I submit, the active intervention of the architect.

Now, Sir, we come to the crucial question upon which we are met together to confer. What is to be done? I anticipate a practical unanimity from nearly all speakers, that matters ought not to be allowed to drift, but I am too well aware of the extraordinary difficulties of the situation to attempt to prescribe a universal remedy. This can only be done after a long and patient inquiry by persons far more able to undertake such a task than I have been. I appeal, therefore, for any suggestions to be taken purely as tentative ideas that I have been led to form as to the lines upon which our future action should be based.

It will have been gathered from my remarks that I feel that it is time for architects to collectively move in the matter through the agency of this Association. I propose presently to ask this Association to sanction the appointment of a Special Committee of Inquiry to thoroughly investigate the matter from the architect's point of view, upon the same lines as the Special Architectural Education Inquiry Committee. I would refer to this Special Committee the question of appointing a Standing Technical Education Committee, composed, if possible, of an equal number of representatives of the Royal Institute of British Architects and of this Association; and I would define the functions of this Standing Joint Committee somewhat as follows:—(1) To place themselves in communication with the Building Trade Federation and the different building trade-unions, and to endeavour to arrive at an understanding as to the minimum amount of knowledge a man should possess to be eligible for election to the unions. (2) To supervise the organisation and working of the various trade classes in the Metropolis, and to indicate where there appears to be a need for further classes. (3) To approach the Technical Education Board and ask that their position may be officially recognised by that Board, either by being permitted to elect a representative on the Board, or by being regarded as its professional adviser on questions affecting the Education of the Building Trades, and that the Board, when allocating the grants in aid of Technical Education made by the London County Council, will give due weight to the recommendations of the Standing Joint Committee. (4) To ask the London Trades Council to be allowed to act as Jury in any further Workmen's Exhibition so far as the Building Trades are concerned, and to set subjects for competition in the various trades. (5) To assist in the organisation of meetings of workmen to discuss questions bearing upon the workmanship of the various trades, and to arrange for architects to be present and take part in those discussions. These draft references will serve to indicate briefly the lines upon which our professional action should run.

The power we architects have in this matter is considerable. Hitherto, we have been satisfied to stand aloof and watch the progress of events. I do not say now that the task I have sketched out should be lightly undertaken. It involves far too much, and will need all our energy and strength if we are to show much result. But I do submit, Sir, that I have made out a case for a most exhaustive and stringent inquiry by some of your ablest heads. If the deliberate report of this Inquiry Committee is that we ought to intervene, then let our action be swift, decisive, and determined. Do not let us swerve from our set purpose till we have set London workmanship, so far as it concerns buildings, on a thoroughly sound basis, and one worthy of this latter half of the nineteenth century.

The President said it was a matter of regret that the opener of the debate, Mr. John Burns, M.P., was unable to be present. He was sure that all would join with him in expressing their regret at his (Mr. Burns's) indisposition. Letters had also been received, expressing regret at their inability to attend the meeting, from Mr. Caröe, Mr. Paul Waterhouse, Mr. Leonard Stokes, and Colonel Bird, all of whom were desirous of taking part in the debate. He called upon Professor Garnett to open the discussion.

Professor Garnett said that he felt that the evils of which Mr. Fleming complained in his able paper were not to be cured by one sovereign remedy—any kind of quack medicine. As they would all readily believe, he was naturally a strong advocate of technical education, but he did not think that technical education was going to get over all their difficulties, and secure for them first-rate workmanship. They wanted to start earlier than technical education began, and they should make first the man and then the workman. What they wanted to do was to provide such education in the public elementary schools as to induce boys to enter into industrial pursuits, and take a pride and delight in work, for its own sake, and not for what it would bring. The man who worked under the pressure of dire necessity to provide the needs of nature for himself and for those depending upon him was little better than the slave who worked under the slave-driver's whip. He only was a free man who did his work because he delighted in it; and who did his work as well as he possibly could because he would have thought it a disgrace to do it in any other way. He was not prepared to say how industrial morality was to be brought about. Anything that tended to raise the moral standard of their children would help them towards the object they had in view. He thought they might look with a great deal of hope in one direction, viz., in that of manual instruction in their elementary schools and in their continuation schools. If they could there get children to work for the love of that work—and to take a delight and pride in that work which they did, they would clearly not be working for what they obtained from it—then the pleasure in manual work would become a habit and second nature. There were many causes, he thought, which tended to produce indifferent workmanship, and Mr. Fleming had told them that bricklayers, for instance, were in the habit of using bricks, the arrisses of which had been chipped and the corners knocked off—bricks, in fact, not suited for first-class face-work. He (Professor Garnett) had had a long and bitter experience in work of that kind. Some bricklayers were of opinion that it was the proper thing to use up all the material brought on the site—viz., making their employers' interest their own. But they did ill, and not well, for the employer in doing that. Of course, the habit of carelessness was one of the things they had to deal with, and that, again, was a habit they ought to try and cure in their elementary schools. It was just as easy for a man to set a brick so that the best face showed in the front of the wall. Over and over again they saw the bricks set the other way about for no reason except out of the habit of pure carelessness. One noticed sometimes a kind of code of honour amongst workmen to help one another, and in many cases they agreed that to do their work badly was good for trade. Professor Garnett then mentioned the case of a working plumber who did his work in first-rate style in all jobs on which he was employed, excepting in one particular instance, and then, when his attention was called to the bad work, he replied,

"Did you think, sir, I was going out of this building without leaving anything behind for the mate?" They might look to the schools to educate the rising generation, but they must look to the trades unions to improve all those who were already in the trade. It was a good thing perhaps for the trades unions to look after the rates of wages and the hours of work, and that now and then a strike should take place in one particular branch of the trade; but it would be a good thing if the trades unions were to devote a good deal of their energies towards educating the workers up to a high moral standard. Although he did not think that technical education was going to cure every fault, it did not diminish the necessity of technical instruction amongst workmen. He thought that technical education had interested workmen, but the question was, how were they to encourage them to go into schools in which thoroughly scientific education was provided? He thought educationalists had made a great mistake in forcing their apprentices to attend classes in mathematics and geometry. If they wished to get the boys interested in their education they must teach the trades separately. They must have a class of geometry for the metal trade workers and for carpenters and joiners, and similarly they must teach artificers mathematics, and so on. If they were to teach effectually they must bring the class into the shop or the shop into the class. If the blackboard and the machinery were separate, the education would be a failure. The skilled student could attend a lecture on geometry and take notes of that lecture, and go home and in a few weeks reproduce that lecture in an examination. But the average workman could not do that, as he has not been trained to take notes and to remember. He must have the opportunity of seeing all the details of making a thing, and then he would never forget how he used his hands in that particular work. They must teach the workman to use his hands, and not simply his ears and his eyes. With the student it was the eyes, the ears, and the brain; but with the workman it was the hand to a great extent that took the place of all the other organs. If they were to make a success of technical education, then they must carry the trades along with them. He hoped that if technical classes were developed in connexion with the Architectural Association, or any other institution in London, that they would never lose sight of the desirability of establishing committees of masters, foremen, and journeymen builders who would superintend the classes and work.

Major Isaacs said that Mr. Fleming very properly devoted one paragraph to noticing what had been done by the City Companies in regard to technical education, and had referred to the Plumbers' and other Companies. He (the speaker) wished to say a few words about the Paviors' Company, as Mr. Fleming had told them that he possessed no information about that Company. Five years ago the Paviors' Company were absolutely without funds, and were looked upon as quite an extinct corporation. Some members of the paving trade, and notably Mr. George Burt at the head of them, very much desired that it might be resuscitated, and they set themselves to work to discover what could be best done. They offered prizes for essays on making carriage ways, their offers being largely responded to, and they were still devoting their energies to fostering technical education. Mr. Fleming had referred to the influence trade unions could exercise with respect to the technical education of the working men. He (Major Isaacs) might tell the members of the trade unions who were present that night that they had to devote themselves to uneducating the British public as to certain matters. They had got to remove prejudices which were fixed in the public mind and also in the minds of the men in the profession to which he belonged. He wanted them to disabuse the public mind of the idea that they did not encourage individual excellence. That had been urged against them over and over again. It had been said that they had tried to bring every one down to one level. They knew that was a grave and crying accusation. Trade unions, if they would take a word of warning from him, would endeavour to disabuse the public mind, and the members of the architectural profession, of that opinion. The trade unions of the present day were charged with laying it down as an instruction to those who were members of the union that beyond a certain amount of work no more should be done. He gave the statement as he had heard it, because it was necessary that the public mind should be disabused of the idea that such teachings prevailed in the trade unions. He was surprised that Mr. Fleming, whilst referring to brick and joiner's work which was done in the sixteenth and seventeenth centuries, did not go a little further and take them to the time of their great master, Sir Christopher Wren. He wondered that he did not tell them to look at work, not only ecclesiastical, but also work of a domestic character, some of which might now be seen in the City of London. He wondered that Mr. Fleming had not asked them to delight their eyes with evidences of exquisite brick and joinery work to be seen in some of the lanes and courts and alleys in the City of London. Where were those bricklayers educated? He thought it was a pity that the good old system of apprenticeship was being allowed to die out. He thought that there was a great deal in a respectable boy being sent to a respectable member of the craft and being bound for seven years and taught his craft and coming out an accomplished and efficient workman. How craft education was given at the present day passed his understanding. He had great faith in the new institutions which had been started. He had listened to all that fell from Professor Garnett as to the class-room and workshop, and he believed that the solution of the problem was to be found in the polytechnic institutions. They had received a very large amount of assistance from the public companies and from the Charity Commissioners, and from private individuals.

Mr. J. Verdon, Secretary of the Building Trades' Federation, said if it were a fact, as Mr. Fleming stated, that there were not 25 per cent. of bricklayers who were efficient, it was to be deplored all round. Mr. Fleming had stated that he had seen a wall so carelessly built that you could not tell the difference between a heading and a stretching course. There was no doubt that that was a very bad case indeed. Probably Mr. Fleming saw that wall in some speculative work in the suburbs of London. Going a little further as to the question of trade unions, he did not believe that there was any trade union of the present day that did not advocate or believe in technical training for working men. As workmen, it was necessary that they should have technical education, and that technical knowledge of their craft which would enable them to follow out the instructions of the architect and builder. With reference to Professor Garnett's assertion that some workmen did bad work because they thought it was good for trade, he (Mr. Verdon) could only say that he never saw any working men who believed that bad workmanship made it good for trade. He could only say that the representatives present that night denied that *in toto*. They did not believe it. He thought that the project under consideration would be the means of drawing the three classes, viz., the architect, the contractor, and the working man, more closely together, and so bridge over the gulf that had divided them in the past. He noticed that Mr. Fleming very often took the opinion of a contractor. It very often occurred that when a workman was engaged on a building that he knew of something which he knew it was necessary to send to the architect about, but the architect would be very chary of speaking to the workman. The workman must keep on with his work, and the fact was that neither the architects nor the master builders were in touch with the workmen. With reference to piece-work, a man generally was obliged to take work at such a price that he could not do full justice to it. With regard to the education of the boys or the workmen, he believed that was a question which the trade unions took a great interest in. As to the boys, he could not see anything at present to induce him, as a father, to put his boy into the building trade. A father would like to know that his son was learning a trade and gaining a sound technical knowledge of that trade, so as to enable him to take a pride in his work, and which any employer would be proud of having. Nobody realised the necessity of educating the workmen more than they did themselves. They realised that there was more education and more technical knowledge required in the trades. Then came the question as to what should be done, and that was a difficult matter. He might say that he believed there was not a working man in that room who would not support any suggestion which would have a tendency to draw the three classes together, and then the friendship would grow and continue.

Mr. Alderman Taylor said that it appeared to him that the question of technical education was somewhat one-sided, because it seemed that the responsibility for all the evil that the building trade was suffering from was endeavoured to be fixed upon the shoulders of working men. That was an argument which he, with all due deference to Mr. Fleming and to the Architectural Association, and to the Master Builders' Association, entirely repudiated. Working men were children of circumstances. It was necessary to probe that question so that they could get at the cause of the evils complained of. He considered there were several causes, and, in his opinion, they were not very far to seek. The cause, in his opinion, rested with the British public. The British public had first to demand good work, and they would get it. The question certainly lay more with the British public than it did with the British working man. He had served twenty-two years as a practical workman in London, and he claimed to know something about their trade. He certainly thought that the workers were, in a measure, responsible for some of the evils complained of, but so also were the Master Builders' Association and the master workmen. If there were inferior workmen so there were inferior masters and inferior architects as well. He did not think that the inferior working man, who was certainly the weakest and the least educated, ought to bear the whole brunt of that, but he thought that they ought to all be prepared to share it equally. He might say that he was very pleased with Mr. Fleming's suggestion with regard to the joint committee, because he thought it was more a question of misunderstanding than anything else. What had been said as to orders and instructions going out from the various trades unions was certainly a misunderstanding and a very grave one, for nothing of the kind had ever emanated from any of the trade unions. If the trade union to which he belonged were to do such a thing he should wash his hands of it to-morrow. He trusted that all present would take it from him that such instructions as those which had been mentioned had never been given out from any of the trade unions connected with the London building trades. They all felt the absolute necessity of technical education, but good workmanship did not rest half so much with technical classes as with the British public, the builders and the architects who should insist upon good workmanship. He did not wish to say anything against the builders or architects, but what was the good of technical education if they were not allowed to put that knowledge into the work? He thought that if they would teach the British public that cheapness was not everything, it would do much more than anything else to educate workmen generally. The railways had done more to make inferior workmen than anything else owing to the sub-letting to various building contractors, and he believed that the London School Board had had more to do with the demoralisation of the working men than anything else, for nobody else had been more instrumental in introducing fourth and fifth-rate builders into the trade. It was simply a question of competition with the architects, and it was simply a question of competition with the builders and the workmen. The public having required buildings the architects in order to make the plans and designs look as well as they could when they were submitted, made them as elaborate as possible. When the tenders came in there were the builders one after another cutting down the prices instead of arriving at one conclusion with regard to the price of the work. He had known a case in which there had been a difference of 100 per cent. between the highest and lowest tender out of twenty.* He thought there was a mistake somewhere. They found then that when the builder had secured a tender it was almost a matter of impossibility for him to bring the work out at a profit. Who was the sufferer in the long-run? The poor British workman! They knew from experience, and very bitter experience, that very often the foreman of the job was responsible for the work which was not carried on as it should be. What were general foremen supposed to be? A general foreman was expected to be a dissembler. The question for the last twenty or thirty years had been cheapness and facility to get over the work; but it did not matter how it was got over. They might depend that as soon as the British public had been educated up to demanding good workmanship the supply would be equal to the demand. Drawings looked very well on paper, but when they came to the execution of them it was a different matter altogether. They had no quarrel with good employers. They often sympathised with them. He sympathised with good employers because there were plenty of them who would be only too ready to have their

* Alderman Taylor may find such cases frequently enough in our "Tenders" column.—ED.

work done as it should be done. They sympathised with the contractors who would do justice to their workmen. He thought that if something could be done in the direction mentioned for technical education he felt that a great deal of good would accrue from it, and certainly to the working man as well as to the British public generally.

Mr. Henry Holloway, who represented the Association of Master Builders, said in the first place he should like to say how much they, as master builders, appreciated the opportunity that had been given them of being present at that discussion, which, he was bound to say, he felt sure would result in good in the end. With reference to technical education and training he believed in the boy or student being allowed to carry out in practice what had been put on paper, so that he should thoroughly understand the trade to which he was apprenticed. Let the boys have some material to work with. Dealing with the question of apprenticeship he did not know that the working man was altogether at fault. A man with a family of six or seven children, with a weekly wage of 30s. or 40s., could not apprentice a boy unless he was prepared to pay a premium. Masters could not be bothered with boys as apprentices, and give them wages, unless they had a premium. A man who was in the position he had indicated could not afford to put his boy into a shop where he would only earn 3s. or 4s. a week for a few years. On the other hand, the master could not afford to give the boy 6s. or 7s. a week when the boy was doing practically nothing. He thought that some of the City Companies having large sums at their disposal could do something towards helping parents to apprentice their sons. He had no doubt in his own mind that general decay in workmanship existed. He would take one illustration with regard to joinery. The foreman of some large London works told him not long ago that there were not six men in the place who could go and carry out a job properly. He considered that the trade unions in some respects were answerable for the decay in workmanship, and he would tell them why. A few years ago a man would never have what they called a full wage until the foreman was satisfied he thoroughly understood his work. What was the present position? He could give them instances in his own personal knowledge where trade unions had compelled masters, or at any rate the young men, to insist upon having full money or leave the job. It came to this; if men could have full money without being efficient, there was no reason to be efficient. He maintained that if the unions insisted upon all the men having the full rate of wages they ought to see that all the men were thoroughly efficient. What he thought they wanted was a better feeling between the men and the masters. When the recent increase of wages was discussed the masters, in the face of the fact that they did not think there was any justification for it, but knowing that there was a spirit of dissatisfaction among the men, came to the conclusion that if they could meet the men in something like a liberal spirit there would be a better feeling of contentment among the men, and that the work would be done better. What was the result? Instead of that he did not believe that any master or master builder had ever had such an awful time as they had had since. When a workman was labouring under a feeling of discontentment he could not do his work well. There was one question which might appear perhaps beside the mark, and that was drink. It was a very curious thing that some of the best workmen were men who became victims to the habit, which, if they wished to make themselves efficient, they would have to get over.

Mr. Max Clarke said that the very worst job he had ever seen was a building which was not by contract, but upon a schedule of prices on which there was a very large commission. He could say in the most emphatic manner that nothing could have been more badly done. Whether that was attributable to the men or the builder he could not say, but it certainly did not depend on the money. If bricklayers got notions into their heads that brickwork should be done in one way, and the architect thought that it should be done in another, it was a most unfortunate state of affairs. He quite agreed with what Mr. Fleming said about the joiners' work at the Workmen's Exhibition. There was no doubt whatever in his mind that the very best workmen drank the most, and exactly at the time when it was most inconvenient. His belief was that men from the North of England were much more provident and industrious than London men.

Mr. Thomas Blashill said that he heartily agreed with nearly every word of Mr. Fleming's paper, and he was glad to see that the discussion had reached such a high level from every point of view. He should not mention any details which might have occurred to him as to the habits of masters and workmen, feeling that if they were to have the proposed committee, things of that kind could very properly be threshed out then. He was fully convinced, from his own experience, as to the difficulty of getting good workmen and work. He thought that if they wanted good workmen they would have to do in the future what they had done in the past, and take them from the country, ready made. Now and then they came to London to better themselves. If they could get the committee together he was certain that good would come of it, not only to those trades, but to London also.

Mr. Searles Wood having proposed a vote of thanks to Mr. Fleming for his paper,

Mr. S. Beale in seconding said that he thought they were attempting to make bricks without straw. They were seeking to have a first-class technical education for the working man, and they had the South Kensington and the whole of the City Guilds working together to advance technical education, but they found from Mr. Fleming's statistics that only a proportion of 1 in 150 of the workmen attended those classes last year. If that was the result, with the forces at work, there was undoubtedly something very wrong in the way they had approached the question. It appeared to him that the inability of the men to produce good work did not rest on the fact that they did not know how to do it, but on the fact that they did not care whether they did it properly or not. With regard to the question of wages, although it had been touched upon, he had not heard a word on the subject which was ringing in many ears at the present time, and that was the subject of the "living wage." If they considered the question in that light he thought they would get near the solution of the difficulty. The question of the living wage was the key to the whole position, for without it no man would take the slightest interest in his work. The working man must have a fair share of the work he produced; a fair day's wage for a fair day's work.

Mr. Sidney Wells, of the Battersea Polytechnic, said that the difficulty they had to contend with was to get workmen to follow the proper trade course. It was the greatest difficulty to persuade men to follow a properly organised course in which things could be learned in their proper order. Without that they could not make technical education a success. He hoped that in any movement which was taken that the London Polytechnics would be taken into consideration.

Mr. C. H. Brodie, who was called on by the President as the Chairman of the Discussion Section, said that he should like to say that the success of the meeting was due to a large extent to the able chief secretary of the discussion section, Mr. H. A. Satchell. Mr. Satchell had not wished to take any part in the debate, and he had asked him (Mr. Brodie) to read a letter which had been received from Mr. Stanley Bird, as follows:—"I should very much like to be present at the discussion to-morrow, as the matter is one in which I take great interest, but, unfortunately, I am unwell, and not allowed out. With regard to head No. 3, some eight or ten years ago I proposed to the Company of Tylers and Bricklayers to revive the system of apprenticeship among bricklayers (in a modified way) in order to meet the difficulty of finding masters who would take boys to live with them as in the olden times, but I grieve to say that the proposal has most miserably failed on account of the difficulty in obtaining boys who were willing to bind themselves for a term of years and who would take to manual work, the majority of them wishing to become clerks, and a much greater difficulty in finding men capable of instructing them. Also when the boys obtained a smattering of their trade they thought that 'Jack is as good as his master,' and either became unmanageable or absconded. At the same time the National Association of Master Builders of Great Britain issued a circular to the building trades throughout the kingdom asking for their co-operation; they also issued a form of apprenticeship, but I am sorry to say that that too fell as flat as the efforts of the Tylers' and Bricklayers' Company. With regard to head No. 4, overtures were then made to the Bricklayer's Trades Unions with a view to obtaining its assistance, but the letters have been merely acknowledged and no further interest taken in the matter. An opportunity has again offered itself. The Carpenters' Guild have taken a building (recently used as a school of art) in Great Titchfield-street, and have opened classes for carpentry, joinery, and wood-carving. They approached the Tilers' and Bricklayers' Company with a view to co-operation, and I am glad to say that a bricklaying class, supported by the latter company, has now been opened, where bricklaying is taught technically. It is a *sine quâ non* that no one shall join the classes unless he is at present engaged in, or intends to take up, the particular trade as a means of livelihood. The Carpenters' Company are spending a large sum on this very desirable object."

The President in putting the vote of thanks said that he was very glad to hear Mr. Alderman Taylor say that the interests of the workmen and the architects were identical, because that was one of his (the President's) very strongest beliefs. They both desired what they ought to desire, viz., to get the best work obtainable, and if the workmen were as anxious to do it as the architects were to obtain it, they would be getting into a better line shortly. He thought that in everything that conduced to the well-being of workmen, no matter in what way it might be considered necessary, architects ought to support them. He was very glad to say that he had had very little experience of the incompetence of the workmen they had heard of. Perhaps he had been fortunate. He had never seen much work to which he could take any proper objection. He did not say that he had never seen any work that was bad, because that would be impossible, but taking the mass of the work, he had had very little to complain of, as far as the workmen were concerned. A good deal was charged against them, as Mr. Taylor said, very unfairly. Mr. Fleming complained, for instance, about chipped bricks. Those were very annoying to architects, and nothing could spoil the effect of work more, but, he (the president) could not imagine a working man complaining to his foreman that the bricks were chipped, because, no matter how much it might annoy him, it would not be worth his while to complain a second time. It had been said also that the North of England men, in his opinion, were better than London men. That was not his opinion, and he had had experience, and was still having it, of both London men and northern men, and, taking them all round, he preferred London men to any men he knew. On the question of drink, he rather wished it had not been referred to.

The vote of thanks to Mr. Fleming, with which the name of Mr. Goldsmith was coupled, was put to the meeting and carried by acclamation.

Mr. Fleming, in reply, said he did not propose at that late hour to go into all the questions which had been raised that night. The subject was too great to be dealt with in a light way. He had been looking into that question for a long time, and had been over London investigating all the different shops and technical classes, and talking to the men and contractors. He could say that some of his most interesting conversations had been with the men, and the intelligence of some of our workmen was very remarkable, and he was sorry that it was not more fully utilised. The decay of apprenticeship was very much to be deplored. It was a great pity. They could never expect to have apprenticeship again as it was formerly. It became a great question as to what was to take its place, and that was why he gave them the figures as to the technical classes. It seemed to him that technical classes did not at present cope with the difficulty, and he thought that was partly because architects, builders, and workmen, for whose benefit the classes were run, were not actively interested in their success. He wanted to see the reorganisation of the London classes. They had three branches of the great building industry—viz., the builders on the one side, the men on the other, and in the centre the architects. He wanted the three classes to combine together and make the British public have good work. He would give notice that at the next meeting he should move the following resolution:—"That a special committee be appointed to inquire into the present facilities in London for the training of apprentices engaged in the building trades, and to consider and report if and in what manner the Architectural Association can usefully exert its influence towards the organisation of a complete scheme of education and its future supervision by architects.

The meeting then terminated.

BARRACKS, BELFAST.—New barracks for two battalions are about to be erected at Holywood, near Belfast, the plans, details, and estimates being prepared by the R.E. Civil Staff at that station.

THE LONDON COUNTY COUNCIL.

THE usual weekly meeting of the London County Council was held on Tuesday in the County Hall, Spring Gardens, Mr. John Hutton, the Chairman, presiding.

Capacity of Water-closet Flushing Cisterns.—The adjourned report of the Public Health and Housing Committee respecting the capacity of water-closet flushing cisterns, the substance of which we published last week, was again brought up, the Committee recommending—

"That the Local Government Board be informed that the Council is strongly of opinion :—(*a*) That regulation No. 21, under the Metropolis Water Act, 1871, should be amended so as to read as follows—'Every water-closet cistern or water-closet service box hereafter fitted or fixed in which water supplied by the company is to be used, shall have an efficient waste-preventing apparatus, so constructed as not to be capable of discharging more than *three* gallons of water at each flush.' (*b*) That the requirements as to the supply of water to water-closets should apply equally to the supply of water to sinks used for receiving any solid or liquid filth. (*c*) That a regulation should be made which shall prevent cisterns being brought into use for supplying water for domestic purposes, or for food for beasts, so long as they directly supply any water-closet or sink used for receiving any solid or liquid filth. (*d*) That in all cases where any premises have a constant water service, one or more taps should be provided in connexion with the rising main for the supply of water for drinking purposes."

Mr. Westacott moved an amendment to strike out the words "not" and "more than" in recommendation (*a*), as, in his opinion, water-closet cisterns should be constructed so as to discharge at least three gallons of water.

Alderman Fleming Williams seconded the amendment, which was adopted, and the recommendation, as amended, was agreed to.

The other recommendations were also agreed to.

London Streets and Buildings Bill.—The Parliamentary Committee brought up the following report :—

"We have finally settled the provisions of this Bill, Parts I. and II. of which were sent to the members of the Council last week and approved on the 5th instant. We have directed a copy of the remainder of the Bill to be sent to each member of the Council, and we recommend—

'(*a*.) That Parts III. to XV. of the London Streets and Buildings Bill be approved ; that the seal of the Council be affixed to a Petition for leave to bring in the Bill ; and that the Bill and Petition be deposited pursuant to the Standing Orders of Parliament, with such verbal alterations (if any) in the Bill as the Parliamentary Committee may consider desirable.'

In connexion with this Bill we have considered the petition (referred to us by the Council on the 5th instant) from the Society of Architects, asking the Council to include in it a power to the council of the society to nominate one person to sit upon the tribunals provided for under the Acts 53 and 54 and 56 and 57 Vic., caps. 243 and 221, or upon any tribunal or tribunals created in substitution thereof. The council of the Royal Institute of British Architects appoints one member of the existing tribunal, and provision is made in the Bill for the continuance of this appointment. We are of opinion, after full consideration, that this representation of the profession is sufficient. We accordingly recommend

'(*b*) That the Society of Architects be informed that the Council cannot see its way to alter the constitution of the tribunal provided for under the Bill.'"

Parts III. to XV. having been gone through and, after various alterations, agreed to, the recommendations of the committee were carried.

The Christmas Holidays.—On the proposition of Dr. Collins, seconded by Mr. Cornwall, it was resolved :—

"That no meeting of the Council be held after Tuesday, December 19, 1893, until Tuesday, January 16, 1894 ; and that there be no meeting of committees between Friday, December 22, and Wednesday, January 10, unless in a case of urgency which will not admit of delay."

The Council adjourned shortly before seven o'clock.

SANITARY INSTITUTE EXAMINATION.—At an examination for Inspectors of Nuisances, held in London on the 1st and 2nd inst., 131 candidates presented themselves. Questions were set to be answered in writing on the 1st, and the candidates were examined *vivâ voce* on the 2nd. Sixty-seven candidates were certified to be competent, as regards their sanitary knowledge, to discharge the duties of Inspector of Nuisances.

"A. A." LYRIC CLUB.—We may draw attention to the special smoking concert of this club, to be held on Tuesday evening at St. Martin's Town Hall, to which all members of the Association are invited, and at which the President of the Association, Mr. Mountford, will preside. This concert takes the place of the one originally fixed for the 15th.

COMPETITIONS.

BOARD SCHOOL, LONDON.—At the meeting of the London School Board, held on the 7th inst., General F. J. Moberly, the Chairman of the Works Committee, presented the award of the assessor, Mr. J. Macvicar Anderson, President of the Royal Institute of British Architects, in the competition for new schools. The assessor's report was as follows :—"Having carefully studied the sixty-one sets of designs which have been submitted in competition for the proposed Board school in Fulham Palace-road, in accordance with instructions issued by you to architects, I have the honour to report that the design numbered 22 should be placed first, the author of which is thereby entitled to the first premium of 150*l.*, with the condition attached thereto as to employment ; the second place to the design numbered 53, the author of which is thereby entitled to the second premium of 100*l.* ; and the third place to the design numbered 37, the author of which is thereby entitled to the third premium of 50*l.* The cost of these three designs is respectively estimated by their authors to be :—No. 22, 22,138*l.* ; No. 53, 18,965*l.* ; No. 37, 19,850*l.*, in each case the estimate being for the school for 1,200 children, without the extensions. . . . . ." The following are the names and addresses of the architects who submitted the plans which have been selected by Mr. Anderson :—Plan No. 22 : architects, Messrs. Arnold Mitchell and Alfred M. Butler, of 16, Finsbury Circus, E.C. ; Plan No. 53 : architects, Messrs. Crickmay & Sons, of 17, Parliament-street, Westminster, S.W. ; Plan No. 37 : architects, Messrs. Leeming & Leeming, Victoria House, 117, Victoria-street, S.W.

INFIRMARY, BRIDGNORTH, SHROPSHIRE.—As the result of an invitation to architects to take part in a competition for a new infirmary at Bridgnorth, South Shropshire, forty-four architects responded, and from this number the committee selected the following ten :—Messrs. Stephen Salter & Adams, of London ; Messrs. Richmond & Cooper, of Westminster ; Messrs. John Giles, Gough, & Trollope, of Charing Cross, ; Mr. W. C. Pite, of Bloomsbury-square ; Mr. W. H. Woodroffe, of London ; Messrs. Thomas Worthington & Son, of Manchester ; Mr. William Henman, of Birmingham ; Mr. Edward C. H. Maidman, of Edinburgh ; Messrs. Meredith & Lunn, of Kidderminster ; Messrs. Waddington & Son, of Manchester. The President of the Royal Institute of British Architects, Mr. Macvicar Anderson, was asked to appoint an assessor to help the committee to draw up conditions of competition and to select the most suitable design out of those submitted by the competing architects, and Mr. Alexander Graham, Vice-President of the Institute, was appointed. Acting upon his advice the committee have approved of and accepted the plans submitted by Mr. Edward C. H. Maidman. The assessor awarded the second place in the competition to Messrs. Worthington, of Manchester, and the third place to Messrs. Giles, Gough, & Trollope, of London.

THE PUMP ROOM EXTENSION, BATH.—At a meeting of the Bath Town Council on Tuesday, the Mayor said they were all aware that that was an adjourned meeting, and they would remember the occasion why it was adjourned, that the Town Clerk, the Chairman of the Baths Committee, and himself might consult together and bring up to the Council further information than they had at the moment. He need hardly say that counsel's opinion had been taken. From the inquiries he had made he found that their whole body was more or less mixed up in a matter which would seriously affect the hitherto untarnished honour of the city. A letter from the ex-Mayor, Mr. J. Murch, was read, in which that gentleman said :—"To me the most obvious breach of faith is this—Major Davis certainly received the commission to prepare the instructions to architects on the understanding that he would not compete. As a member of the committee I assented on that condition. I did so because I thought it would be irregular and unfair that he should prepare instructions to himself and possess—from his position—knowledge on points not included in the instructions but extremely useful to a competitor. Again and again I was told in the months that followed, Major Davis had repeated his determination not to compete. Now, however, we see the result ; there are the designs of 'O,' with all the obvious proofs of superior advantage. The competitors who could only be guided by the instructions lose their chance. But even at the eleventh hour 'O' does not declare himself. . . . At all events it seems to me the duty of our Council is clear—to pronounce disqualification on two grounds, the omission of the name and the breach of faith as to competition." The recommendation from the Baths Committee was then presented :—"That provided the Council are satisfied that the omission of the name of the author of the design marked 'O' was accidental, this Committee is of opinion that such omission should not disqualify him, the same not having been detrimental to the other competitors." Mr. Chivers asked if it would not be better that they should be quite sure who was the author of "O." Captain Peel-Floyd : There is no doubt about it. I met Major Davis yesterday, and he asked me as a friend and something else to support him. That shows that Major Davis is "O." Alderman Jolly then handed in the following notice of motion :—"That the resolution with respect to the plans marked 'O' as passed at the meeting of the Council on the 5th inst. be rescinded as far as it authorises that the work should be carried out." Alderman Chaffin asked if it was not impossible without notice to move that. The Town Clerk said it was quite competent for Alderman Jolly to give notice of his resolution to be placed on the agenda at the next meeting, while the discussion on the motion before the Council could be proceeded with. Alderman Chaffin moved that the meeting be adjourned. Mr. Ricketts seconded, and the motion was agreed to.

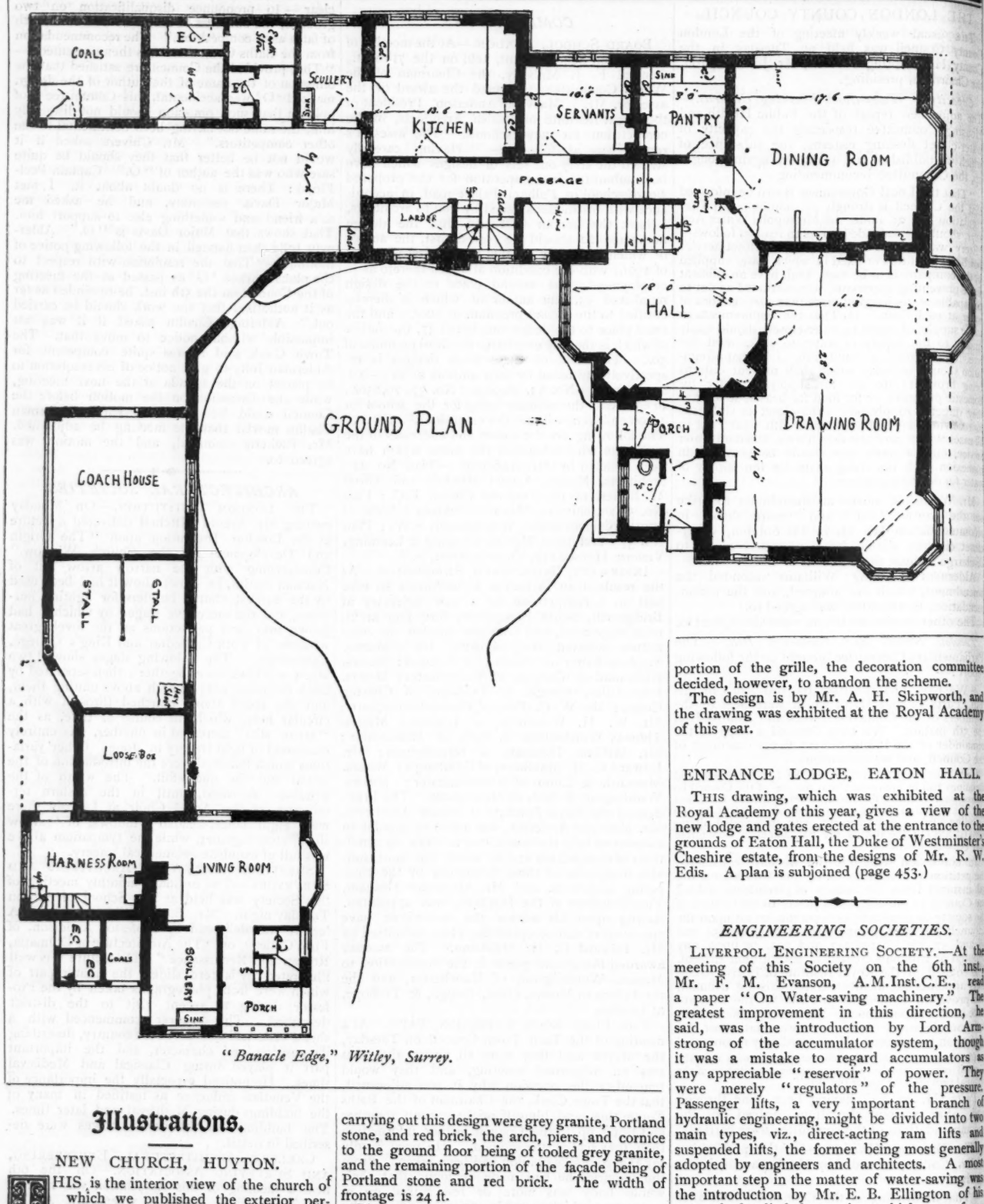
ARCHITECTURAL SOCIETIES.

THE LONDON INSTITUTION.—On Monday evening Mr. Arnold Mitchell delivered a lecture at the London Institution upon "The Origin and Development of the Church Window." Commencing with the narrow arrow slit of Norman castles, he showed how it had been used by the earliest church builders for lighting purposes, and the successive stages by which it had grown into such perfections as the lovely great windows of York Cathedral and King's College, Cambridge. The following stages showed two arrow windows close together ; then separated by thick mullions, next an arch above uniting them, and the space above punched through with a circular hole, which, in course of time, as the "arrow slits" increased in number, was entirely composed of light tracery in stone. Other variations which followed were the introduction of the trefoil and the quatrefoil. The width of the windows increased, until in the eastern termination of the Angel Choir at Lincoln there were eight lancet-headed windows, or "arrow slits," close together, while the tympanum above was full of exquisite geometrical tracery.

SHEFFIELD SOCIETY OF ARCHITECTS AND SURVEYORS.—The ordinary monthly meeting of this Society was held at the School of Art on Tuesday night. Mr. E. M. Gibbs presided. A lecture was delivered by Professor Anderson, of Firth College, on "The Architecture of Dalmatia, Roman and Renaissance." The lecture was well illustrated by lantern slides, the greater part of which were from photographs taken by the Professor during a recent visit to the district described. The lecturer commenced with a short, historical account of the country, describing its position and character, and the important part it played during Classical and Mediæval times. He noticed especially the importance of the Venetian influence as testified in many of the buildings during Mediæval and later times. The buildings in the various towns were described in detail.

CARLISLE ARCHITECTURAL, ENGINEERING, AND SURVEYING ASSOCIATION.—On the 6th inst. a meeting of this Association was held in the Town Hall, Carlisle, when Mr. A. W. Johnston gave a paper entitled "Styles of Architecture," in which he reviewed the various styles from the Early Grecian period down to the present time.

GLASGOW ARCHITECTURAL ASSOCIATION.—The usual monthly meeting of this Association was held in the rooms, 114, West Campbell-street, on the 5th inst., when a paper on "Hospital Planning," was read by Mr. A. N. Paterson, M.A., A.R.I.B.A. After alluding to the component parts and details of design, the lecturer, by reference to hospitals in Glasgow and elsewhere, described the varieties in plan from the double ward to the pavilion, pointing out the advantages and disadvantages of each. The general principles governing the planning of hospitals, he said, though few, admit of great variety of outline, resulting from peculiarities of site, &c., and in all cases architectural effect must be strictly subordinated to the various requirements. A discussion followed, and at the close a vote of thanks was awarded the lecturer.



"Banacle Edge," Witley, Surrey.

Illustrations.

NEW CHURCH, HUYTON.

THIS is the interior view of the church of which we published the exterior perspective view, and a plan and description, in the *Builder* for September 2 of this year, to which we refer the reader.

Mr. W. D. Caröe is the architect.

"BANACLE EDGE," WITLEY, SURREY.

THIS picturesque country house, designed by Mr. Basil Champneys, was built in 1891 and 1892, on a beautiful spot in Witley, commanding fine views of Blackdown and Hindhead. The contractor was Mr. Millar, of Witley.

As will be seen from the plan, the arrangement of the house and out-buildings is somewhat unusual, and certainly effective.

The perspective drawing was exhibited at the Royal Academy of this year.

PROPOSED BUSINESS PREMISES, EXETER.

THE materials intended to be employed in carrying out this design were grey granite, Portland stone, and red brick, the arch, piers, and cornice to the ground floor being of tooled grey granite, and the remaining portion of the façade being of Portland stone and red brick. The width of frontage is 24 ft.

The architect is Mr. S. K. Greenslade, and the design was exhibited at the Royal Academy this year.

DESIGN FOR FRIEZE.

THIS frieze, which was exhibited at the Royal Academy of this year, was designed for a bathroom, to be executed in low relief plaster, silvered, and coloured with various coloured lacquers. The design is by Mr. Paton Wilson.

DESIGN FOR IRON GRILLE FOR ST. PAUL'S.

THIS design, representing one of three schemes in wrought iron for treatment of the quarter domes, was intended, as is seen from the drawing, to fill up the semicircular openings, 40 ft. long, at base, and was to have been entirely gilded on the face. After seeing a full-size model of a portion of the grille, the decoration committee decided, however, to abandon the scheme.

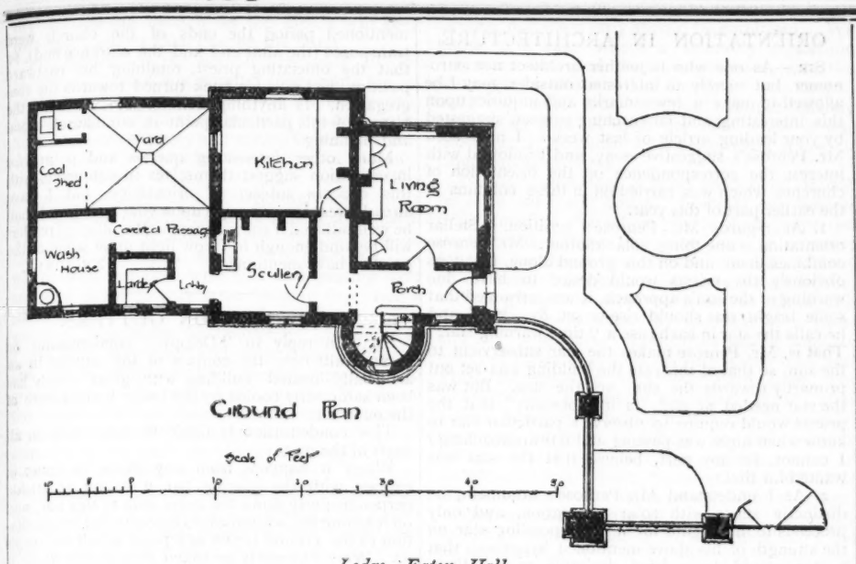
The design is by Mr. A. H. Skipworth, and the drawing was exhibited at the Royal Academy of this year.

ENTRANCE LODGE, EATON HALL.

THIS drawing, which was exhibited at the Royal Academy of this year, gives a view of the new lodge and gates erected at the entrance to the grounds of Eaton Hall, the Duke of Westminster's Cheshire estate, from the designs of Mr. R. W. Edis. A plan is subjoined (page 453.)

ENGINEERING SOCIETIES.

LIVERPOOL ENGINEERING SOCIETY.—At the meeting of this Society on the 6th inst., Mr. F. M. Evanson, A.M.Inst.C.E., read a paper "On Water-saving machinery." The greatest improvement in this direction, he said, was the introduction by Lord Armstrong of the accumulator system, though it was a mistake to regard accumulators as any appreciable "reservoir" of power. They were merely "regulators" of the pressure. Passenger lifts, a very important branch of hydraulic engineering, might be divided into two main types, viz., direct-acting ram lifts and suspended lifts, the former being most generally adopted by engineers and architects. A most important step in the matter of water-saving was the introduction by Mr. E. B. Ellington of his patent hydraulic balance, since which many forms of hydraulic balances have been constructed by all the principal lift manufacturers; the main object of the balancing cylinder being to obviate the use of balance weights attached to the cage by either chains or ropes, also all overhead sheaves, and at the same time to reduce the quantity of water used to the smallest practical amount. In the case of direct-acting lifts working from the Hydraulic Power Company's mains, the chief advantage was the reduction of water used. Of these balances, the most recent type was that known as the "patent double hydraulic balance," introduced by Messrs. C. & A. Musker, Bootle, the principle of which was there were two rams, equal in aggregate area to the one in Ellington's type. To raise (say) two or three passengers, according to what is desired as the load for the "single" power, water is admitted to one ram only, whilst for any greater number of passengers water was admitted to both rams. This arrangement involved no complication of valve gear, as only one hand-rope was adopted, and in order to



Lodge, Eaton Hall.

open the second port to admit the water to the second cylinder it was only necessary to pull the hand-rope another 18 in. or so further.

THE CIVIL AND MECHANICAL ENGINEERS' SOCIETY.—The annual address of the President (Mr. Reginald Bolton) of this Society was delivered at the opening meeting of its session on the 14th inst., and was devoted to the subject of "The Literature of Engineering." After reference to the value of technical book study in connexion with, or in addition to, practical education, Mr. Bolton considered the difficulties that lay in the way of the technical student by reason of the vast amount of material at his disposal, and the absence of any standard catalogue of works, and of any system of cataloguing and indexing the same. A bibliography of applied science works, and glossaries of technical terms, were shown to be needs of the present day, and their publication under the authority of the learned societies was held to be the proper course. A system of guide-books to study, or condensed bibliographies, several of which were suggested to the respectively interested organisations, was advocated. The question of what not to read was gone into, and led to a consideration of periodic literature, and some of the systems followed in it were condemned. The question of opening and rendering accessible scientific libraries was dealt with, as was the need for greater liberality on the part of certain societies in purchasing books. The address closed with an outline of suggested reading for the young engineering student.

THE INSTITUTION OF CIVIL ENGINEERS.—At the ordinary meeting of the Institution of Civil Engineers on the 12th inst., Sir Benjamin Baker, K.C.M.G., Vice-President, in the chair, a paper was read dealing with "Cask-making Machinery," by Mr. Lewis H. Ransome, Assoc.M.Inst.C.E. The chief difficulties to be overcome in the application of machinery to the manufacture of barrels were stated to be, 1st, the different sizes and varying shapes of barrels; 2nd, the diversity of the materials employed; and, 3rd, the difficulty of working wood by machinery without undue waste.

ARCHÆOLOGICAL SOCIETIES.

BRITISH ARCHÆOLOGICAL ASSOCIATION.—The last meeting of this Association was held on the 6th inst., Mr. C. H. Compton in the chair. Mr. C. Brown reported the discovery of an inscribed Roman stone in the foundations of the ancient tower called Pemberton's Parlour, Chester, which latter fell down early in the year, and has since been rebuilt. By permission of the Marquis of Bute plans were exhibited of the excavated remains of the Black Friar's Priory, Cardiff, which have recently been entirely laid open to observation. The remains are within the Castle enclosure, at the western entrance to the town, and the entire ground plan has been recovered. Other extensive excavations within Cardiff Castle, carried out by the direction of the Marquis of Bute a few years ago, were also indicated on a plan of the Castle sent for exhibition. A long continuous wall of Roman date, with angular towers, has been met with on the east side of the Castle enclosure, buried beneath earthen banks of later date, on which a Mediæval wall had been erected. Excavations elsewhere indicate the existence of a similar return wall on the north side. Mr. Loftus Brock, F.S.A., exhibited a piece of fine black Roman ware, with patterns traced by hand, found in London. Mr. Earle Way described some remarkable Roman bracelets of bronze which have recently been found at Bankside, Southwark, with evidences of the existence of an extensive cemetery; other examples were of Kimmeridge jet. Mr. Davis exhibited an earthenware matrix of the arms of London, found at Hampstead. A paper was then read on the discovery of part of the Saxon Abbey Church at Peterborough, prepared by Mr. J. T. Irvine, and read in his absence by Mr. Loftus Brock. The discovery was made after the demolition of the central tower, when certain foundations, evidently of early date, were met with, cut into by those of the existing Norman church. The piers of the tower recently removed were found only to stand upon the plaster floor of the Saxon buildings, without any more solid base. The ancient walling was traced as far as possible, and the outlines of two transepts and of a square presbytery have been determined. These are exactly parallel to the existing Norman walls, but the axis is more to the south than that of the present church. The discoveries were shown on a large plan. Some of the Saxon stonework bears evidence of its previous use in some more ancient building. A paper was then read on the excavation of the Stadium on the Palatine Hill, Rome, prepared by Dr. Russell Forbes. The works undertaken in celebration of the silver wedding of the King and Queen of Italy are now brought to a close, and the enormous building can now be inspected. The walls were partially lined with marble and partly coloured. The ranges of arches, the galleries, and the other architectural features were described in detail.

SOCIETY OF ANTIQUARIES OF SCOTLAND.—The first monthly meeting of the Society of Antiquaries of Scotland for the session was held in the Society's Library, Queen-street, Edinburgh, on the 11th inst., Mr. Balfour Paul, Lyon King of Arms, in the chair. The first paper read was an account of the prehistoric fortified towns of Eildon, Roxburghshire, and Treceiri, Carnarvonshire, by Dr. D. Christison, Secretary. In the second paper, Mr. J. M. Gray, of the Scottish National Portrait Gallery, gave some additional notes on the heraldic glass at Stobhall and in the Magdalen Chapel, Cowgate. He said the stained glass in St. Magdalen's Chapel in the Cowgate had been recently releaded, and placed in a state of thorough repair. The tomb of Janet Rhind, widow of the founder of the chapel, had also been protected. These measures for the protection and preservation of the window and tomb had been accomplished through the aid of six Fellows of the Society, with the co-operation of the Scottish Reformation Society, who own the chapel. In the third paper, Mr. John N. Macleod, of Saddell, discussed the question of the identification of the site of Delgon or Kindelgen, the seat of Conall, King of Dalriada, in the middle of the sixth century.

Correspondence.

To the Editor of THE BUILDER.

DECORATIVE ART AND THE ROYAL ACADEMY.

SIR,—I have just read your short notice of Mr. Richmond's lecture at the "Arts and Crafts" Exhibition—a lecture which was, I believe, made unusually interesting to the audience, not only by the illustrations, but by the fresh and intelligent explanations—the personality, indeed, of the lecturer.

But it certainly has struck me as a remarkable instance of the "innocency," if one may say so, of English painters, even of distinguished ability, with regard to all that side of their art which is outside the usual gilt frame, that here is a man, worthily an Associate of the Royal Academy, who only *after* being entrusted with a decorative work of the very highest importance, discovers, as if quite previously unknown facts, a whole series of perfectly well-known and much-written-about phenomena, familiar to every decorative colourist, and mentioned by most writers on decorative colour. I think, perhaps, the most recent explanations of the effects of outlines, or superimposed lines, of colour in altering the apparent tones of the ground-colours with which they are in contact, are in the admirable little book on colour which was published, about 1887, by Professor Church, of the Royal Academy; a book quite the most excellent of its kind. I know that I have myself laid stress on these very facts (not as discoveries) in every lecture I have ever given to students on architectural colouring; and that I prepared, at least as long ago as 1874, a whole series of illustrations of those effects for lectures, one of which I find in the *Builder* for that year.

It is, to me, quite amazing that no attempt should be made, in the teaching of our young painters, to impart some knowledge of these, and such as these, phenomena of colour, which are, so to speak, the very backbone of the art of colouring applied to architecture. Even Royal Academicians cannot always go on ignoring that side of their art which, after all, is the one in which the greatest men have found the noblest field.

J. D. CRACE.

LABOUR *v.* BRITISH WORKMAN.

SIR,—At the excellent and interesting discussion at the Architectural Association on Friday evening two most important phases of the subject were very inadeqately treated—namely, the question of "levelling up," and that of "drink." The labour representative, on behalf of the workmen, assured us that all of the better sort were desirous of proper education, perfection of workmanship, a proper day's work for a proper day's pay, and the general advancement of those who join the Union. And, as far as profession goes, nothing could be more satisfactory and encouraging. But when we come to the policy pursued by their organisations it is exceedingly difficult—nay, impossible—to reconcile the one with the other. The men deceive themselves and each other into believing this to be really the case. Men, if of sufficient respectability, are attracted, coerced when possible, to join a trades' union absolutely without any proper test, or trade qualification, under the assurance that they shall not receive less wages than their more competent or more industrious neighbours. Under the name of brotherhood and good fellowship, young men who have not learnt their business, and older men who have, are dragged in, whilst the best men are denied the opportunity of making the best of their own abilities and attainments. The inevitable tendency is to reduce all men to a meagre mediocrity. It is the interest neither of the competent nor of the incompetent workman to advance; and many of the best men who will not be kept down are practically driven out of the trade, to become supervisors in some capacity or other. It is not, surely, to the true interests of good brotherhood that a man with superior capacities should be debarred or discouraged from advancing himself as best he can by means of his natural endowments. And is it to be hoped that board school education will enable the rising generation to look at this in a different light? Can the industrial schools and colleges so revolutionise the present state of things as to lead to a reversion of a base and degrading policy, whilst only 1 in 150 of working men are taking advantage of the opportunities afforded them? Then, indeed, trades unions might look forward to enjoying

the confidence of employers and the public generally; and the good work prophesied for the future might have some hope of fulfilment.

A similar evidence of good brotherhood is professed in a practice which is often, if not generally, followed; but which demonstrates its absolute falsity. The men on a job agree together to have so much beer served round daily at certain periods. This is all very well, though I may question the individual benefit to any. But then all are made to pay their share of the beer, whether they drink it or not; and some are found with the moral courage to decline it, leaving to others the benefit (?) of their share. Is it possible that sensible men should not see the immorality and the cruelty of such a course? It is now well known that alcohol acts as an actual dêterrent to labour. The permission of this practice does not indicate much progress in "levelling up," whatever may be the desires or the professions of those who constitute themselves leaders of their policy and action. For all waste, of whatsoever description (even the lost labour and deprivation caused by strikes), is a serious loss and injury to the whole community. WILLIAM WHITE, F.S.A.

30A, Wimpole-st.

"AMERICAN ROOFING SLATES IN IRELAND."

SIR,—I must notice a reference in the *Builder* to a "recent report of a Consular Agent" advertising the use of American Sea-green Slates in Ireland. That humbug, allowed to fall into oblivion for twenty years or more, should be exploded.

About 1870 lots of American sea-green slates came into this country unfortunately. Owing to the vagaries of Welsh slate-winners in that year sixty miles across the Channel they were, *pro tem.*, comparatively cheap.

Mr. Street, with characteristic inconsistency and obstinacy, *must* have American slates in his restoration of Christchurch, Dublin. They are as bad slates as I have had the experience to know in Ireland. They grow bad-coloured, brittle, and earthy in Irish climate. They are a perpetual nuisance and annual expense in renewals and repairs on the cathedral and synod-house. This new importation of Pennsylvania slates, "free from pyrites and of extraordinary toughness," will want a twenty years' character before any one here would look at them.

THOMAS DREW, F.R.I.B.A.

Christchurch, Dublin.

VANDALISM AND THE LONDON SCHOOL BOARD.

SIR,—Will you allow me, in the hope that publicity may obviate similar action in future, to call the attention of your readers to the unfortunate and unnecessary act of Vandalism now being perpetrated by the London School Board in the demolition of what is known as "The Old Palace," Bromley, near the Church of Stratford-atte-Bow?

This historic building, date 1606, apart from the associations connected with it, contains within some twenty panelled rooms of various periods, and examples of some of the most beautiful Elizabethan carving and plaster work in England, the design of the latter being as refined and the execution as perfect as any at Hardwicke, Haddon, or Hatfield.

There appears no reason why the old house, which is in admirable preservation, should not have been adapted or at least incorporated into the new building which the School Board are proposing to erect. The instructions of the Code as to buildings will probably be pleaded against this, but a little care on the part of the officials of the Board, and a little "enlightened Conservatism" instead of the present doctrinaire ignorance and wastefulness might have prevented the replacement of a beautiful building by the regulation Board School.

Instead of this we are using the ratepayers' money for the destruction of work, the mere commercial value of which, when removed, may be estimated in hundreds of pounds, to the great benefit of the Wardour-street harpies, who will reap their 500 per cent. on the deal.

But there is another aspect to the case which will appear to many to be more serious still.

The educational value of a great Elizabethan landmark, with its historic associations, would have been incalculable on the minds of the children, and the neglect of this by a public body like the London School Board appears unpardonable. C. R. ASHBEE.

Essex House, Bow.

ORIENTATION IN ARCHITECTURE.

SIR,—As one who is neither architect nor astronomer, but merely an interested outsider, may I be allowed to make a few remarks and inquiries upon this interesting and far-reaching subject, suggested by your leading article of last week? I have seen Mr. Penrose's suggestive essay, and I followed with interest the correspondence on the orientation of churches which was carried on in these columns in the earlier part of this year.

1. As regards Mr. Penrose's position. Stellar orientation is one thing, solar another. Mr. Penrose combines them, and on this ground alone, that "as obviously the priests would desire to have due warning of the sun's approach, it was arranged that some bright star should rise or set, &c., &c.," and he calls the star in each case a "time-warning star." That is, Mr. Penrose makes the star subservient to the sun, so that at this rate the building was set out primarily towards the sun, not the star. But was the star needed at all? Is it "obvious" that the priests would require to observe a particular star to know when night was passing and day approaching? I cannot, for my part, believe that the star was wanted for that.

2. As I understand Mr. Penrose's argument, he distinctly starts with solar orientation, and only proceeds to investigate for a corresponding star on the strength of his above-mentioned hypothesis that a star would have been desirable as a "time-warner." He then has first to consider what dates archæology will allow him to deal with (although his whole object is to *fix a date* by means of the orientation, so that this is certainly very like arguing in a circle), and next to investigate whether within those dates any bright star was in or close to the sun's path, and so situated as either to rise in the eastward line of the temple an hour or two before the sun, or to set in the westward line about the same time. Mr. Penrose claims that in every one of twenty-eight temples which he has examined such a star is to be found, and points out that in view of the limitations imposed by the above conditions, it is in the highest degree improbable that in all these cases a bright star should be found, in the right position at a possible date, merely by accident. But he goes back a long way for some of his dates, as, to mention one or two, 1275 B.C. for the Temple of Æsculapius at Epidaurus, 1445 for the Heræum at Olympia, and 1530 for the archaic temple on the Acropolis. Also his "bright stars" are not all of the first magnitude, *e.g.*, α Arietis, γ Pegasi, ζ Aquarii. If time-warning stars were really required, surely conspicuous stars would have been chosen. If, on the other hand, the stars themselves were the real objects of the orientation, it is difficult to conjecture what could have been the significance of such a dim and inconspicuous star as ζ Aquarii.

3. What was the arrangement of Greek temples in the matter of doorways? Was there commonly a door at each end? Mr. Penrose often calculates his dates by a star which was to be observed from the adytum *setting* an hour or so before the sun would be rising. This he does with the temple at Ægina, where the remarkable eccentric western doorway is one of the most important pieces of evidence in support of his hypothesis. But a door at the west as well as at the east end must have abolished most of the gloom and mystery of the sanctuary.

4. The little temple at Bassæ was set out due north and south; is it then reasonable to talk of its being "oriented" at all? And if there was an eastern doorway specially opened for the admission of the morning sunbeams, why was the building not set out east and west to start with? Is not this rather suggestive of an orientation-at-any-cost theory?

5. Is the opinion of Fergusson and others as to the irregular disposition of the Greek buildings, as on the Acropolis, to be considered as out of date—the theory, that is, that they were placed irregularly to secure picturesqueness of general effect and to accentuate the independent value of each building?

6. Is it known with what object the Egyptians set out their temples, or some of them, towards certain rising stars, as it certainly appears they did? Was the "Bull's Thigh" a sacred constellation, or had they a merely practical object, to make the temple a sort of observatory for the observation of the re-appearance of a star (after its annual conjunction with the sun) in order to mark off as it were a certain important date in the natural year? We are told, I believe, that the re-appearance (heliacal rising) of Sirius was coincident with the beginning of the Nile flood.

7. The direction of sacred buildings towards the east seems to be a world-wide practice. Nor does it appear surprising. They must be set out in some direction, and what point more proper than the east, the most important, so to say, of the four quarters of the horizon—certainly the most inspiriting. But we know that sun-worship is widespread among primitive religious forms, and that, in this particular of orientation, traces of it are to be found in modern Christianity. The general rule now is that the eastern end of Christian churches is closed, but I have read that prior to the fifth century the rule was that the altar was at the west end, the celebrant standing behind it, facing at once towards the east and the congregation, but that about the above-mentioned period the ends of the church were transposed (the altar end and the entrance end), so that the officiating priest, retaining his eastward position, had now his back turned towards the congregation. Is anything definite known about the history of this particular point in our church ritual and planning?

Many other interesting queries and points for investigation suggest themselves in connexion with this obscure subject of orientation, but I have already trespassed enough upon your space, and shall be well satisfied if some of your archæological readers will be kind enough to throw light upon some of the points I have mentioned. ENQUIRER.

CONDENSATION GUTTERS.

SIR,—In reply to "Drippy,' condensation on glass results from the contact of the vapour in an artificially-heated building with glass which has been sufficiently cooled by the lower temperature of the outer air.

This condensation is liable to take place on all parts of the glass.

When it happens from any cause to come in contact with the glazing bar, it is apt to trickle perpendicularly down the outer side of this bar, and on reaching the bottom edge thereof to fall by gravitation to the ground (or on any plant which intercepts it). Were a properly arranged drip-groove there it would catch such water and carry it down its channel to the eaves' gutter. But besides this, the condensation water formed on other parts of the glass runs down until it comes in contact with the overlapped edge of the square below. Here the water globules are likely to be retarded and to run along the edge of the glass until they also come into contact with the bar, when they would drop as above described were no drip groove there. The contact of one globule with another also often diverts their course.

For the above reasons I think "Drippy" will see that condensation gutters are of very practical usefulness, and, indeed, essential if drip is to be avoided. At the same time it is quite true that good glass is also essential. Where glass has irregularities on its surface they check the condensed moisture, which is liable to drip from them directly. Evidently condensation gutters would not prevent this. But this inferior glass should never be used.

WM. PARHAM.

Northgate Works, Bath.

The Student's Column.

GEOLOGY.—XXV.

ROADS.

THE influence of geology in determining the nature and cost of maintenance of roads must be manifest to every road-surveyor. As the physical features of a district are to a large extent due to its geology, the action of the weather on the rocks producing characteristic slopes, it follows that the gradients of roads, and, to some extent, locally, their direction also, are almost entirely governed by geological considerations. To a certain extent, it is true, improved methods of road-making have had their influence in overcoming Nature where she is unkind. The engineer has modified natural gradients by making cuttings and embankments. The surveyor has so constructed the surface of roads and maintains them in such excellent order that they have no chance of relapsing altogether into their pristine condition. But, in spite of these alterations, geology yet exerts considerable influence on them.

Let us quote one of numerous examples that might be given in proof of this. Mr. F. J. Bennett, of the Geological Survey, states* that some years ago a friend of his went on a bicycle tour from Norfolk into Derbyshire and back, and, on learning the route taken, Mr. Bennett rather surprised him by drawing up in tabular form an accurate estimate of the gradients, road material, general condition and average riding state of the roads on each of the geological formations ridden over during the journey. This was done by consulting a general geological map of England, but it of course required some considerable knowledge of the science also.

It is a well-known fact that where a thick stone coating is not used on the surfaces of roads, their condition will vary with the subsoil, especially where, as in many country districts, the metal is very thinly laid on, and the incorporation of the stone with the underlying ground is left to local traffic, and not properly rolled in. For example, in a case where a road passes over a clay and sand subsoil, and is metalled with one description of stone, it will be found that during wet weather the clay subsoil portion will be much softer than that part on the sandy subsoil, and in

* "Proc. Geologists' Assoc.," vol. x. (1887-8), p. 377.

dry weather the portion on the former will keep firm much longer than that on the latter.

Mr. Bennett, in the memoir previously alluded to, remarks that roads running over oolite are, as a rule, very bad—in fact, they are the worst roads known, especially if metalled with the same rock. Such ways are slippery and muddy in wet weather, and dry into ruts under the action of the sun, wind, and frost; whilst in very dry weather they become extremely dusty. The gradients are usually long, and but slightly inclined, except at a scarp. The same may be said with reference to roads on the Chalk formation in regard to gradients, but where well metalled with flint and passing over an open country, they soon become dry after a shower, and keep firm a long time in fine weather. Roads on Carboniferous Limestone as a rule have very long and very steep gradients, and unless well metalled become muddy and greasy; or, on the other hand, dusty. Roads on the Bagshot Sand, or similar formations, are usually dry, even in fairly wet weather, unless the sand contains much clay; in times of drought, however, they are liable to become dusty. Roads on strong clay land, unless well metalled, occasionally develop more or less extensive cracks after a spell of dry weather, and small subsoil slips may take place on them after heavy rains, especially where the gradient is rather steep, as in some London Clay districts. In certain parts of the country, the lanes and roads are much deeper than would otherwise be the case, from the circumstance that during wet weather they are more or less converted into river courses, and have thus been excavated by the erosion due to flowing water. It is next to impossible to keep such ways in good repair, except through the medium of effective drainage. We often find long stretches of roads on hard rock of such a durable nature that the District Surveyor is content to leave them alone; such a policy is very short-sighted, as in time the surface becomes rough and undulating, when it is difficult to repair.

The question is sometimes asked—What are the essential characters of a good road metal? The answer is not difficult to give; it should be hard, tough, and of durable mineral composition. The vast majority of road metals used in this country, except, perhaps, in large towns, have none of these attributes, and are generally of the worst possible description. As might be surmised from what we have already said, the principal road metal in country districts is that found in the immediate vicinity of the roads. The average Local Board prefers, when possible, to obtain the material, no matter how unsuitable it may be, from within its own jurisdiction. Thus, we could point out enormous tracts of country where the metal employed is an earthy description of limestone raised from the Lias or one of the oolites. In a certain part of Wiltshire the other day we noted that a rough Jurassic limestone was carted at least *six miles* from a stone pit to be laid on a high road; its character was such that it is sure to become utterly rotten in the course of a year. On inquiry, we elicited the fact that the majority of the roads in the vicinity were mended with the same material. It is not that District Surveyors, as a body, are unaware of the worthlessness of such "metal"; it is that in too many instances it is cheap; whilst a sentimental feeling sometimes prevails that the local stone trade ought to be encouraged, and occasionally vested interests may have some influence in the choice of material.

We venture to point out, however, that in the long run, such road metal as that just alluded to is not cheap—in fact it is very much the reverse. Roads that are strongly and well made in the first instance last for hundreds of years, and require but little attention. Contrast the old Roman ways with those made at the present day. The late Sir W. V. Guise thus described* the condition of that part of the Roman military road from Gloucester to Caerleon, between Soudley and Blackpool Bridge, in the Forest of Dean (the *Via Julia*). Where it remains perfect, he says, it consists of roughly-squared blocks of conglomerate, or of Millstone Grit, of 10 in. to a foot cube each, with a well-set line of marginal stones, about 15 in. long by 5 in. wide, and 10 in. deep. "The strength of the work is such that after the lapse of all these centuries, but for the use that has been made of it as a quarry for roads, fences, and buildings, it would have been in good order still." It is too much to expect that local authorities at the present day will construct such roads as this; but they should at any rate possess sufficient public spirit to insist that good and durable macadam only should be employed. We know of a case where a tolerably crystalline limestone was used on a certain road, and the scavenging was such that a crop of 500 tons of mud per mile was produced proportionately against 60 tons of mud per mile when it was subsequently replaced by a better class of metal. Comment is needless.

We have said that a good road metal should be both hard and tough. Some of our readers might imagine that where one of these properties is present in a stone, the other must of necessity follow; but this is by no means the case. Many of the hardest stones in existence are very brittle, so that great care must be taken to distinguish the difference between the hardness of a stone and its toughness. Again, the same kind of material varies in respect of both these qualities. Flint, for example, is a very hard stone, but when freshly quarried is extremely brittle; after a time, however, it begins to lose this detrimental character, when it is difficult to find a much better metal for the average country road. In certain districts Chalk flints are full of little cracks, which render them comparatively useless.

The specific gravity of stones is frequently quoted in matters relating to road metalling; but we submit that it is of no real use in this connexion. For instance, igneous rock, containing a large proportion of silica, would, *cæteris paribus*, be of less specific gravity than another in which magnetite, or some other form of iron, was present in considerable quantity. The former may be a compact rock, and the other comparatively loose. No one should have any doubt as to the respective qualities of the two materials as road metals. Some quartzites (rocks made almost entirely of crystalline silica) are very suitable; but they are often rather brittle.

"Resistance to crushing" is sometimes referred to as a criterion in selecting road metal; but we do not think the actual facts sufficiently support this view. The steady pressure of machinery on a plane surface, as in experiments on crushing, must not be compared with that uncertain, uneven, grinding action to which road metal is subjected.

That road metal should be composed of durable minerals goes without saying; and these should be so disposed with reference to each other that a species of binding or interlocking is set up. Materials on roads are often subjected to very severe chemical tests. On some country roads, the stones after a rain might be described as being literally in a chemical solution of great strength, which is trying its best to disintegrate them.

If we had to select classes of stone specially suitable for macadam on roads of great traffic, our choice would unhesitatingly fall upon the finer-grained hornblendic granites and syenites. They seem to answer to all the primary qualifications of good metal, and have been well tried for many years in the most exposed situations. We do not say that these are the only kinds of rock best suited to the purpose—indeed, we have already mentioned a few others—but they seem, as a whole, to be uniformly good. We must caution the student in this connexion to be certain that he is actually dealing with hornblendic granites and syenites, not merely with rocks bearing these names for commercial purposes, and which sometimes are totally different classes of materials. We have previously described the essential features of the two igneous rocks mentioned, and there is no necessity to repeat them. An instance has recently come under our notice where a crystalline limestone of the Carboniferous formation is sent extensively to the market as "granite." This is a flagrant case that ought to be widely known. We are aware that for years a similar rock has been exploited as "granite" in Belgium, but were not altogether prepared to find it quarried also in England. Crystalline Carboniferous Limestone is a good road metal enough in its way, but it is entirely different in chemical composition, structure, durability, and otherwise to granite. The only points of similarity are that both are hard and crystalline—the very characters that are apt to be misunderstood by the road surveyor.

* "Proc. Cotteswold Nat. Field Club," vol. vi. (1872-6), pp. 189, 287.

THEATRE OF VARIETIES, SHOREDITCH.—A company, under the name of the "London Music Hall Company, Limited," is about to be formed for purchasing the London Theatre of Varieties, Nos. 95-99, High-street, Shoreditch. The present building has a frontage of 70 ft., an area of 8,000 ft. superficial, and a capacity of 1,330 seats. The freehold, goodwill, and licences are valued by Messrs. J. T. Wimperis & Arber, architects, at 80,000*l.*, which is the purchase price fixed by the vendors.

OBITUARY.

MR. ALEXANDER LESLIE.—The death is announced of Mr. Alexander Leslie, of the firm of Messrs. J. & A. Leslie & Reid, C.E., Edinburgh. Deceased, who was the son of the late Mr. James Leslie, engineer, was educated at the Edinburgh Academy and University. He became a partner in his father's business in 1870, and since that time has taken part in most of the undertakings in which the firm has been concerned. After Mr. James Leslie's death in 1889 the firm was continued as engineers for the Edinburgh and District Water Trust, and the Water of Leith Purification and Sewerage Commission, and they have been consulting engineers in most new water supply schemes introduced by Scottish Corporations of recent years. During the past year Mr. Alexander Leslie held the position of President of the Royal Scottish Society of Arts.

GENERAL BUILDING NEWS.

CHURCH OF ST. ANDREW'S, PAIGNTON, DEVONSHIRE.—The church of St. Andrew, in Sands-road, Paignton, was opened, and dedicated as to its chancel and gifts a few days ago. The new church is only completed so far as the chancel and eastern end, which has been built by Mr. E. P. Bovey, of Torquay, from plans by Messrs. Fulford, Tait & Harvey, architects, Exeter, at a cost of about 3,000*l.* The whole structure is designed to cost 8,000*l.*, and pending the raising of the necessary funds for completion a temporary wooden nave has been erected by Messrs. Drew, of Paignton. The finished eastern end comprises the sanctuary, choir, morning chapel, organ chamber, and clergy and choir vestries. The style is based upon the French fourteenth-century period. The building is executed in local red rock, with box ground stone dressings externally, and Hamhill stone dressings internally. The flooring of the chapel and vestries is of oak blocks, and that of the chancel is marble mosaic, while the steps and sanctuary are of Devonshire marbles. Behind the altar space is allowed for the erection of a reredos. The roof over the chancel and morning chapel is of oak, while that portion of the latter which is situated in the tower is covered by groined stone vaulting. The metal work in the church has been executed by Messrs. Singer, of Frome. A bell which has been placed in the belfry chamber was cast by Messrs. Taylor, of Loughborough.

PROPOSED NEW FREE CHURCH AT PETERCULTER, N.B.—The Deacon's Court of this congregation have now selected one of the three plans prepared by Mr. Rust, jun., architect, Aberdeen, for the new free church to be erected in the village of Culter.

EXTENSION OF THE BLACKPOOL CONVENT.—A new wing is about to be added to the Convent of the Holy Child Jesus, Layton Hill, Blackpool. Plans have been prepared by Mr. Councillor R. B. Mather, architect, for a new wing to be added at the south end of the convent. In the basement, provision will be made for thirteen music-rooms, as well as accommodation for a gymnasium. On the first floor a room some 78 ft. long by 31 ft. 6 in. wide will be available for school purposes, whilst on the second floor will be a chapel, with sacristy and inner sacristy. The present chapel will be transformed into a sleeping dormitory, and other internal rearrangements will be made.

THEATRE AND HOTEL, NORWICH.—Mr. J. B. Pearce, F.R.I.B.A., of Norwich, has prepared designs for a theatre and hotel, which the Norwich Grand Hotel and Empire Theatre Company propose to erect in that city, The site, situated at the corner of Red Lion-street and Orford-hill, and between Thorpe and Victoria railway-stations, covers a superficial area of 20,860 ft., and is now occupied by some freehold property. Messrs. Baker & Sons, of Queen Victoria-street, land agents and valuers, have estimated that the buildings designed by Mr. Pearce, together with the freehold site, will be worth 90,000*l.*

SCHOOLS, WARRINGTON.—Lord Cross recently laid the foundation-stone of the new schools which are being erected in Manchester-road, Warrington, and which are to be known as the Fairfield National Schools. The buildings are estimated to entail a cost of 6,000*l.* The architect is Mr. W. Owen.

MERCHANTS' EXCHANGE, CARDIFF.—According to the *Western Mail*, the old Merchants' Exchange was completely destroyed by fire in November, 1892, and the new exchange which is to be built, and which will occupy the site of the old building at the Pier-head, with frontages to Bute-street, Bute-crescent, and the Pier-head, is estimated to cost nearly 30,000*l.* The basement will contain a large entrance-hall, on the left of which there is to be a coffee-room, 32 ft. by 40 ft. On the right of the entrance-hall there will be a grand staircase, leading to the billiard-room, 34 ft. by 24 ft., and also to the restaurant, which will be 30 ft., by 59 ft., and lighted by skylights on both sides. This part of the building is to be supported by iron columns. An ontside entrance to the restaurant will be provided at the north-west portion of the building. The remainder of the space will be utilised for cellars, to be used in connexion with the shops, which will be erected on the ground-floor to face Bute-street. On this floor will be provided two main entrances, 6 ft. in width, leading to the grand

staircase. In the front of the building facing the Pier-head large offices will be partitioned off, the two in the centre being 18 ft. by 24 ft. and the two on either side 18 ft. by 17 ft. On the side facing the dock there will be two suites of offices, which, if necessary, can be converted into ten rooms by extending the hall. On the north side there will be accommodation for five offices. The first and second floors are arranged in a similar manner to the ground-floor, with the exception that offices will be provided instead of shops. There will also be a central corridor, 5 ft. wide, and in addition, on the second floor, well holes intended to give light to the corridor below. The third floor is to be principally devoted to kitchen purposes. The exterior of the building will be worked in red brick and terra-cotta, and Forest grey and red stone. The entrance steps will be of granite, the chimney stacks of red brick, and the roof will be covered with green slates. Mr. E. W. M. Corbett is the architect.

Hall, Presbyterian Church, Newcastle.—The foundation-stones of a new hall, in connexion with the John Knox Presbyterian Church in Elswick-road, were laid recently. A hall is to be first erected, and when that is completed a new church will be built. The plans were prepared by Mr. W. Lister Newcombe, architect, Newcastle, and the contract was let to Mr. J. H. Mauchlan, Newcastle. The front of the building will be of polished stone. On the basement there will be a gymnasium 37 ft. by 17 ft.. There will also be a storage-room and a chamber for heating apparatus. On the first floor, in the front part of the building there will be a hall, and a library, which will be 30 ft. by 18 ft. At the rear of this will be the hall, which, until the new church is completed, will answer the purposes of a place of worship. This hall will be 50 ft. by 40 ft., and will accommodate 400 persons. Above these rooms will be the caretaker's house and vestry. The cost of the hall is estimated at 2,300*l.*, whilst the whole of the work when completed will cost 7,500*l.*

The Restoration of Arbroath Town Church.—At a meeting of the Arbroath Presbytery, on the 5th inst., plans by Mr. Burnet, architect, Glasgow, for the rebuilding of the town church, destroyed by fire upwards of a year ago, were submitted by the town-clerk and approved of.

Gasholder, Newcastle.—The new gasholder for the Redheugh Gas Works of the Newcastle and Gateshead Gas Company has just been completed. The holder has a capacity exceeding three millions cubic feet, and has been erected from the plans and specification of Mr. V. Wyatt, the Engineer, by the contractors, the Whessoe Foundry Company, of Darlington. The floating or storage portion of the gasholder weighs about 600 tons, and the guide framing, exterior to the holder, weighs about 400 tons. The gasholder is divided vertically into three sections which are telescoped together. The outer section is 180 ft. 10 in. in diameter by 43 ft. 9 in. in depth; the middle section is 177 ft. 4 in. diameter by 42 ft. 9 in. deep; and the inner section is 174 ft. 4 in. by 42 ft. 9 in. deep. The latter has a domed crown with a rise of 11 ft. at the centre. When the three sections of the holder are telescoped and raised together, the total height is 136 ft. 9 in. from the tank coping to the top of the dome. The top curb to the inner or upper section of the holder, and which takes the compression strain of the crown, is formed of steel plates ½ in. thick, curved to form a quadrant, into which are fitted the vertical stiffeners and gussets, and the plates are double covered at the butt joints, and rivetted in four lines of rivets throughout. On the top of this curb are rivetted and fitted the sixteen pairs of guide carriages and rollers to control the movement of the holder. The other sections or lifts of the holder have a corresponding number of pairs of guides. The pair of carriages and rollers for each standard are arranged at right-angles to each other. There are three rows of horizontal girders to the guide framing, corresponding to the three sections or lifts of the holder, of the single lattice type. The steel is of the Simens Martin quality. The gasholder tank is 184 ft. in diameter by 44 ft. 3 in. in depth, is constructed of Portland cement, concrete, and brickwork. The contract for the tank was entrusted to and carried out by Messrs. Walter Scott & Co., contractors, of Newcastle-on-Tyne. The special ironwork built into the tank was supplied and fixed by the Whessoe Foundry Company, and the whole was carried out under the superintendence of Mr. Moodie and Mr. Gibb, the company's managers at Redheugh. The cost of the gasholder, with tank and connexions, will be nearly 30,000*l.*

Restoration of Gretton Church, Northamptonshire.—On the 5th inst. the Church of St. James', Gretton, was re-opened by the Bishop of Peterborough, after restoration. The building, which is chiefly of the Norman period, has been restored by Messrs. Talbot, Brown, & Fisher, architects, of Wellingborough, the builder being Mr. George Henson, also of Wellingborough, the total cost having been about 1,000*l.* The roofs of the nave and south transepts, which were much decayed, have been renewed in oak and re-leaded. The clearstory windows have been restored to their original design and re-glazed. The north wall of the nave, which was in the most dangerous state, has been rebuilt and strengthened, and a buttress has been built outside. The windows of the north aisle have also been restored and re-glazed, whilst in the south transept new four-light windows have been placed and the interior restored, new oak seats of the same pattern as those in the other part of the church being provided. Several other parts of the church also require restoration—the chancel, which needs re-roofing, new choir stalls, and east window, whilst the tower requires attention, one of the pinnacles having already had to be removed to prevent it falling and causing damage.

Alterations at the Tyne Theatre, Newcastle.—The alterations at the Tyne Theatre, which have been in progress for some time past, have just been completed. The most important structural alteration has been made in the entrances. Every department of the theatre has now a clear entrance of its own. A new staircase has been built outside the theatre from Westgate to the gallery. This staircase has doors entering from it to the dress circle, the upper circle, and the gallery. It is constructed of stone, cement, and iron, and is only intended to be used as an exit. Precaution has been taken to prevent fire. Alarm-bells connected with the office of the fire brigade are placed on the stage and on every circle. The dressing-rooms and saloon have been warmed by hot water, and the electric light added to some parts of the house in addition to gas. The saloon and the boxes and pit entrances have been made by Mr. G. H. Moor, carpenter; the new staircase by Messrs. J. & W. Lowry, contractors; the sanitary arrangements and gas-fittings by Mansfield Gibson; the electric lighting by Messrs. R. J. Charleton & Co.; the hot-water apparatus by Messrs. Dinning & Cooke; the new iron balcony by Mr. Thomas Alder, of Gallowgate; and the painting has been done by Messrs. John Richardson & Co. The whole of the alterations have been executed in accordance with plans prepared by Messrs. Oliver & Leeson, architects, Newcastle, and carried out under their supervision.

Chancel, St. Alban's Church, Streatham Park.—The new chancel at St. Alban's Church, Streatham Park, was consecrated recently by the Bishop of Rochester. Seven years ago a portion of the church was erected at a cost of about 7,000*l.*, and the chancel now added will, with its vestries, cost over 2,000*l.* Messrs. Gregory & Co., of Clapham Junction, have executed the whole of the works. The architect is Mr. E. H. Martineau. The tower and spire extension at the west end, fence walls, gates, &c., require to be completed.

Club Premises, Wolverhampton.—A working men's club is being erected in North-road, Wolverhampton. Messrs. C. Manton & Sons, of Wolverhampton, are the architects. On the first floor is the concert room, with elevated platform extending across the west end, near which is the retiring room. Lavatories and other requisites are provided. Immediately under the room is situate the smoke-room, and adjoining is the stewards' room and bar. The lower or basement story consists of cellarage, boiler-room, &c. Messrs. Jones & Attwood, engineers, of Stourbridge, will supply the heating apparatus. Messrs. Butler Brothers, of Wolverhampton, are the contractors.

School, Kirkintilloch, Dumbarton.—An addition to Lairdsland School, Kirkintilloch, has just been opened. The new school runs parallel with the old one, but is considerably longer. It is Gothic in style and the building is 140 ft. long by 32 ft. broad. It is divided into ten class-rooms—five on each flat—each of them to accommodate sixty-four pupils. The dimensions of each room are 27 ft. long by 24 ft. broad. The whole length is divided by sliding partitions, and can be thrown into one large room if required. A corridor runs along the line of the building, dividing it from the old school. It has entrances at each end with stairs to the flat above. Mr. Mitchell, of Coatbridge, is the architect.

Mechanics' Institute, Dodworth, Yorkshire.—On the 4th inst. a mechanics' institute was opened at Dodworth. The building has been erected under the supervision of Mr. Moxon, the architect, Barnsley, by the following contractors:—Masons and bricklayers, Mellor & Moorhouse, Barnsley; carpenter and joiner, F. W. Ownsworth, Dodworth; slaters, Pickles Brothers, Leeds; plasterer, T. Lindley, Barnsley; plumber and glazier, B. Denison, Barnsley; painter, William Todd, Barnsley; heating, Newton, Chambers, & Co., Thorncliffe. The erection is constructed of brick, relieved by stone dressings, pressed brick being used for the facing of the main frontage. In addition to caretaker's house, lavatory, heating chamber, &c., the accommodation includes:—Downstairs: A billiard room, a reading room, and a room for games. Upstairs: Two class rooms over the reading room and games room respectively, and a lecture hall over the billiard room.

Wesleyan Mission Buildings, Birmingham.—On Monday the foundation-stones were laid of a new building for the Lozells-street Wesleyan Mission, Birmingham. The plans for the new building were prepared by Messrs. Crouch & Butler. The central hall of the building will seat about 1,200 people, and in addition to this meeting-house there will be a lecture hall to accommodate 500 persons. Two rooms partly in the basement of the building will be used as a gymnasium. The structure will be built of red brick with stone dressings, will be 85 ft. by 76 ft., and the various rooms will be laid with wood blocks.

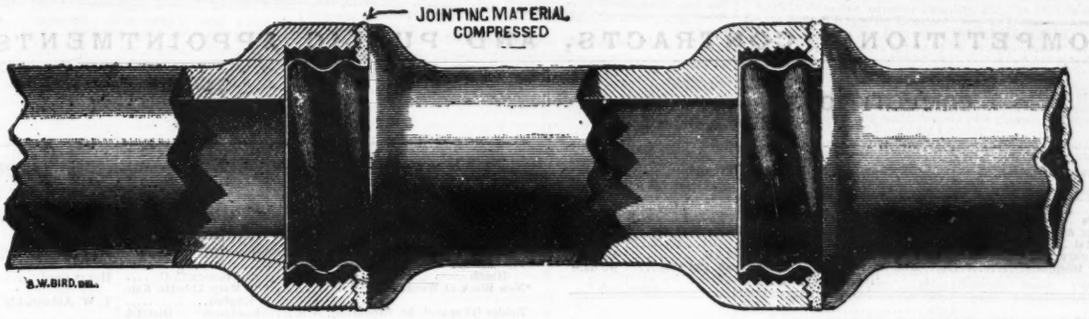
SANITARY AND ENGINEERING NEWS.

Proposed Reconstruction of the North Bridge, Edinburgh.—A meeting of the Edinburgh Town Council was held on the 7th inst. for the purpose of considering whether Parliamentary powers should now be obtained for the improvement and widening of North Bridge and North Bridge-street. Sir William Arrol was present for the purpose of giving a report on the subject, and he reported that he had carefully examined the state of the masonry of the North Bridge, and as far as he could see it was at present in a fairly satisfactory condition for carrying the ordinary traffic of the city. His plan No. 1—widening the bridge to 75 ft. within the parapets—involved a cost of 45,000*l.* The second plan, involving a cost of about 62,000*l.*, included extensive alterations at the north end amounting to 26,000*l.*, which would be borne by the railway company. The third plan provided for the removal of the present structure and the substitution of an entirely new bridge of three spans, of which the principal part would be steel. The cost of this new bridge erected complete would be about 80,000*l.* The bridge was so designed that it could be erected without the necessity of providing a temporary bridge or interfering with the traffic of the street. All three plans, he stated, were of the same width, 75 ft. To erect a two-span bridge would cost 10,000*l.* more.—The Lord Provost moved the adoption of the report by the Lord Provost's committee, which recommended that, taking into consideration the rights and interests of the Corporation affected by the proposed Bill of the North British Railway Company, that the Magistrates and Council should meantime resolve to proceed with a Bill in terms of the notice already given, such Bill to be submitted for the consideration of the Magistrates and Council at the earliest possible date. His object was to keep the question open. He had no hesitation in saying that he did not think either the plan No. 1 or the plan No. 2 would do at all. It was something in the nature of plan No. 3 that they must go on with. Treasurer Macrae seconded the motion, which was ultimately agreed to.

FOREIGN AND COLONIAL.

France.—M. Spuller, member of the Senate, has been appointed Minister of Public Instruction and Fine Art, in place of M. Poincarée, resigned. ——M. Jules Cousin, the well-known Curator of the Carnavalet Museum, has retired, and is replaced by M. Lucien Faucon, Assistant Curator of the Municipal collections.——The Académie des Beaux-Arts has awarded the Chaudesaigues prize to M. Binet, pupil of M. Laloux. The Académie has given as a subject for the Achille Leclère prize for 1893-4, "Une Sacristie."——An exhibition has just been opened at the Georges Petit Gallery, of the paintings and water-colours of the late Louis Cabat. The family of the painter have offered to the State, for the Luxembourg Museum, one of the best of the painter's works, "Le Chemin Montant."——The Conseil-Général of the Seine has commissioned the military painter, M. Arus, to execute, for the decoration of the Mairie of Alfortville, a large picture representing "Manœuvres of Pontonniers on the Marne."——It is proposed to organise at Dieppe a museum of furniture and other objects of artistic workmanship, offered to that town by M. Saint-Saëns.— The jury of the competition opened at Suresnes for the construction of a Salle des Fêtes and an École Maternelle has awarded the first prize to MM. Bauhain and Godefroy, the second to M. Dauvergne, the third to M. Felix Boutron —all of Paris.——The Orleans Railway Company is to open on the 18th of the month, two new lines, that from Bourges to Cosnes, and that from Florent to Issoudun.——Important works are to be undertaken shortly for the improvement of the harbour of Nice.——A rope railway is to be established to connect the town of Havre with Côte Sainte Marie.——The death is announced of M. Alexandre Guillaume, principal engineer to the railway company "de l'Est."—— The sea-painter Vincent Cordouan has died at Toulon at the age of seventy-seven. The works of this artist, who was indefatigable in his labours, are to be found scattered throughout all the museums of the South of France.——We learn also of the death of M. Georges Billouin, a painter of landscape and *genre*, pupil of Drolling and Cabat. He entered the École des Beaux-Arts in 1840, and obtained medals in 1865, 1869 and 1874. He has painted numerous little historic scenes in which known personages were introduced, such as "Les Prédictions de Nostradamus," "Tintoret Giving a Lesson to his Daughter," "The Atelier of Reubens," "Rembrandt in his Atelier," &c., and was an able and very painstaking artist.——It is proposed to remove the artistic collections of the City of Paris into the pavilion of the Champs Elysées, in order to permit the National Society of Horticulture to continue its annual exhibitions, which were formerly very successful.

Germany.—Professor Rashchdorff, the architect of the new Berlin Cathedral, who holds a professorship at the Royal Technical College, has celebrated his 70th birthday. A banquet was given in his honour at which the Government, the Royal Academy and the learned bodies were represented.



——The Dresden municipality has endowed a travelling studentship for architects as a memorial to Gottfried Semper. Its value is 80*l.* It will be open to competition next year.——Munich is to have some extensive covered markets. Designs have been prepared by Herr Rettig, the City Architect, and by Herr Eggert, of the Board of Works' office. Either designs will require an expenditure of about 81,000*l.*——Bonn is apparently about to show an unprecedented activity in its public works. Competitions are to be opened for a new Town Hall, costing about 12,000*l.* A new concert hall with a theatre, and a new bridge over the Rhine, are also to be built.

BELGIUM.—According to the *Belgian News* an influential committee has now been formed for the creation of a new "Art" Theatre.——Count de Lalaing's new pictures on the grand staircase of the Hôtel de Ville being completed, the redecoration of the large Council Chamber is to be commenced next year.——The Municipality of Laeken has voted 150,000 francs, or 6,000*l.*, for the erection of a local museum.

VIENNA.—The new Raimund Theatre has been opened at Vienna. It is a "People's" Theatre built without much elaboration. According to the local press there are serious defects in the plan.

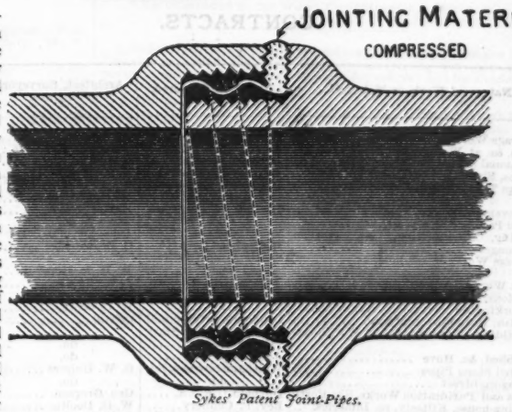
JUBILEE OF SHANGHAI.—The largest and most important of the Treaty Ports in China—viz., Shanghai, celebrates its jubilee this year. In commemoration of the event a presentation medal has been struck, and is to be paid for out of the public funds. The medal has been designed by Mr. F. M. Gratton (of the firm of Morrison & Gratton, architects, Shanghai). It presents on the obverse an ornamental shield, supported by Chinese dragons, and bearing the words "Shanghai Jubilee, November 17, 1893," with sprays of the cotton and tea plants as ornamental fillings, and on the bend the name of the recipient. Above the shield is a steamer directed towards the rising sun. The reverse bears the Shanghai municipal coat of arms, the date of the opening of the port, "November 17, 1843," and a half-wreath composed of the rose, shamrock, and thistle. On the rim are to be engraved the words "Presented by the Shanghai Municipality." The dies have been engraved and the medals struck by Mr. Allan Wyon, of London.

MISCELLANEOUS.

THE ROMAN WALL, NEWCASTLE.—According to the *Manchester Guardian*, a discovery has lately been made on the Roman Wall near Newcastle. The Wall consists of two parts—a stone wall built by Hadrian to keep back northern barbarians, and a Vallum, or earthwork, running parallel to it on its south side, of which the origin and object are disputed. Dr. Collingwood Bruce, the Newcastle archæologist, maintained that this earthwork was a rear defence for the stone wall, a protection against possible onslaughts by unquiet southern Britons. This theory has lately been challenged, notably by Mr. Haverfield, who believes the earthwork to be devoid of military purpose, and probably to be older than the stone wall. Some sections cut through the earthwork by the Newcastle antiquaries now seem to show that this is actually the case. At one point, it is said, a road has been found which provided communication along the stone wall, and this road crosses over the earthwork to run along its south side. In other words, during the existence of the stone wall the earthwork was so little regarded that a road was taken across it and continued along its southern or exposed face. Further excavations may, of course, show that this discovery is something exceptional, and not characteristic of the wall or earthwork as a whole. If, however, further investigations confirm it, the conclusion we have indicated must inevitably follow, and the problem of the Vallum will be one step, and that a long step, nearer to solution. It will be a striking, though perhaps a pathetic, testimony to the paramount importance of excavation if the long labours of Dr. Bruce shall be shown to have just failed of success because he neglected the easy task of a few weeks' spade-work.

MEMORIAL STATUE, MANCHESTER TOWN HALL.—On the 8th inst. Lord Kelvin, President of the Royal Society, unveiled the Joule Memorial Statute, which has been placed in the Manchester Town Hall. The work has been done by Mr. Albert Gilbert, and the statue forms a companion to Chantrey's statue of Dr. Dalton.

SYKES' PATENT JOINT-PIPES.—This pipe-joint, made by the Albion Clay Co., is an ingenious and elaborate contrivance for securing a perfectly gas-tight and water-tight junction, and in that sense appears to be a complete success. The spigots and sockets of the pipes have a large thread-screw formed upon them in a composition which is keyed on to the pipes by a toothed key (see lower diagram), and hardens, leaving exterior surfaces with the screw-thread formed by an undulating section as shown by the white line on the diagrams. The pipes are screwed together, but a jointing material in a soft state, composed of Portland cement and tar, is placed between the flange of the one pipe and the end of the socket of the other, and squeezed up as the pipes are screwed together, which operation drives part of the jointing material into whatever space may be left between the two screws, which of course require to be left in the first instance with a certain amount of play, but are by this means filled up solid, and the material sets hard. It is impossible to imagine how anything can get through this joint. There is however one defect, which may be got over with care, but which will have to be guarded against. In the specimen left at our office we find that the jointing material has been so far rebellious that it has not allowed the end of the spigot to come close up to the flange of the socket, consequently a nick about a quarter of an inch wide is left round the interior surface where the pipes butt. Now it is quite true, as the patentees say, that their joint prevents or renders improbable the formation of any internal ridge at the joints (by wet cement coming through and setting); but a furrow at the joints is only a degree less mischievous; it checks the flow of the sewage and catches small solids, and it may lay the foundation for building up a ridge which will be as mischievous as the cement ridge. The specimen sent to us may have been badly joined, but there is the furrow there, and it is a defect.



Sykes' Patent Joint-Pipes.

BUILDERS' WORK AND THE LONDON SCHOOL BOARD.—At the meeting of the School Board for London, held at the Board-room, Victoria Embankment, on Thursday, the Works Committee reported that the Board, on November 9, 1893, referred to the Committee for consideration and report the following Memorial, which had been presented to them from the London Building Trades Federation:—"1. That the recognised minimum rate of wages for the London district has not been adhered to by the builders doing the Board's work. 2. That the Board should insist on all contractors tendering for the Board's work supplying a schedule of wages paid to their *employés*, and if found less than the Trade Union rate of wages, the tender be not entertained. 3. That the Board do insert a clause in all contracts to the effect that no portion of the contract work be sublet to any workman or workmen. 4. That in such parts of the work appertaining to a contract as cannot be done entirely by the contractor in the ordinary course of his business, sub-contracting be only allowed by the direct sanction of the Board. 5. That the workmen employed directly by the Board are not paid the recognised minimum rate of wages for the London district. The Memorialists, therefore, pray that the School Board for London will favourably consider their requests embodied in this Memorial." The Committee were of opinion that a reply should be forwarded to the Memorialists to the following effect:—1. That all cases of complaint to the Works Committee, some even made anonymously, have been investigated immediately by the officer of the Architect's Department, and that, generally, if not universally, the complaints have not been established. The wage books have shown that the men have signed for the amount which is either at or above the minimum rate of wages. The officers of the Board have no means of testing the correctness of the information for or against; whereas, the matter is easily settled in a magistrate's court. 2. That the contract already contains the following clause:—"Where the London scale of wages shall apply, the contractor shall pay to the workmen employed by him not less than the minimum standard rate of wages in each branch of the trade. In all other districts where the London Scale of Wages shall not apply, the contractor shall pay the workmen, and all other persons employed by him in connexion with his contract, not less than the minimum standard rate of wages, which may, for the time being, be usual and generally paid where such workmen are employed." That the rates are liable to variation, and therefore a schedule might not have force during the two or three years which are occupied in building a school. 3. The Board's Architect reports that subletting is not, and never has been, allowed to a workman or workmen, but if at all, only to some firm of experienced and acknowledged position in the special line, with whom the same conditions are insisted upon. 4. That no part of the work can now be sublet without the permission of the Architect, who reports his action to the Works Committee. The Board would have to obtain the opinion of that officer (their professional adviser), and except that some considerable delay would occur, probably little or no change in procedure would ensue. 5. That the workmen employed by the Board are now paid the recognised hourly rates of wages for the London district.

"FIRE-PROOF AND SOUND-PROOF PARTITIONS."—The "Fire-proof, Cementing, and Plastering Company" send us under this heading sections and a description of their form of partition, which is built up of blocks, preferably about 6 ft. by 10 in. by 2 in. thick, formed of hollow tubes embedded in and faced with the company's patent fire-proof cement. They claim for this method the advantages of being light, sound-proof (owing to the interior hollow tubes) and a very little thickness. We should doubt the sound-proof quality being complete, as there is a continuous thickness of cement between the tubes, but no doubt the hollow tubes will to an appreciable extent diminish the transference of sounds through the partition. The blocks are clamped at intervals to the framing. The partition seems a good sound one, fire-resisting and economical of space; but we confess we are in favour of a partition which is solid throughout rather than one with hollow spaces in it.

ART EXHIBITION AT DOUGLAS.—The sixth exhibition of the Isle of Man Fine Art and Industrial Guild was opened on the 6th inst. at the Palace, Douglas. Oil paintings, water-colours, and decorative painting are exhibited; and other exhibits comprise carving, needlework, school work, laundry work, &c. Specimens of plain and fancy brick making on the Ruabon principle were introduced by Mr. A. C. Kelly, of Ballanard, who opens out a new industry in the island.

LEGAL.

TYLER & SONS *v.* SHARPE BROS. & CO.: ALLEGED INFRINGEMENT OF A REGISTERED DESIGN.

THE case of J. Tyler & Sons, Limited, *v.* Sharpe Bros. & Co. came before Mr. Justice Romer in the Chancery Division on the 8th inst., it being an action brought by the plaintiffs, of London, against the defendants, of Burton-on-Trent, for an injunction and damages in respect of an alleged infringement by the defendants of a registered design of the plaintiffs', in respect to water-closet basins, the registration of which was effected in 1890. The defendants denied the infringement, and also suggested that the plaintiffs' design had been anticipated in respect to basins by their own water-closets, and

COMPETITIONS, CONTRACTS, AND PUBLIC APPOINTMENTS.

COMPETITIONS.

Nature of Work.	By whom Advertised.	Premiums.	Designs to be delivered.
*School Buildings	Hartlepool Sch. Bd.	.....	Jan. 1'94
*School Buildings, &c.	Clenchwarton Sch. Bd.	10*l.* 5*l.*	Jan. 14
*Isolation Hospital	EastGrinsteadU.R.S.A.	5*l.* 5s.	Jan. 31
*Public Hall, Library, &c.	Kirkcaldy T.C.	50*l.* 30*l.* 20*l.*	Mar. 17
*Two New Fever Hospitals	Met. Asylums Board	200*l.* 150*l.* and 100*l.*	No date

CONTRACTS.

Nature of Work or Materials.	By whom Required.	Architect, Surveyor, or Engineer.	Tenders to be delivered.
*Sewerage Works	Stockport Corp.	A. M. Fowler	Dec. 18
Stairs, &c. at Workhouse	Belfast Union	Young & Mackenzie	Dec. 19
*Additional School Buildings	Dartford School Board	G. H. Tait	do.
Stables, Fire Engine Station Yard	Burnley Corporation	F. S. Button	Dec. 20
Storage Tank, Outfall Pipe, &c. Ireland	Blackrock and Kingstown Drainage Bd.	W. G. Strype	do.
Improvement Works, Thackrah-street	Halifax Corporation	E. R. S. Escott	do.
Public Paving (three years), &c.	do.	do.	do.
Flagging, Channelling, &c. (various passages)	Birkenhead Corp.	C. Brownridge	do.
Drainage Work, Marsh-lane, &c.	Southowram (Halifax) Local Board	W. H. D. Horsfall	Dec. 21
Street Works (Large contract)	Nelson (Lancs.) Corp.	J. W. Bradley	do.
Additions, &c. to Mineral Water Works, Workington	.....	W. G. Scott	do.
*Rubbish, Hard Core, and Sand	LondonCountyCouncil	*Official*	do.
Re-building Chimneys, &c. at Workhouse	Plympton St. Mary Union	do.	do.
*Drill Shed, &c. Hove	Admiralty	do.	Dec. 22
*Silicated Stone Pipes	Walthamstow Loc. Bd.	G. W. Holmes	do.
*Making-up Street	do.	do.	do.
Sewers and Purification Works, Shadforth	Durham U.R.S.A.	Geo. Gregson	do.
Dwelling-house, Kilteely, co. Limerick	Rev. P. Connery	W. G. Doolin	Dec. 23
Cemetery Chapel Works	Trowbridge Burial Bd.	C. E. Ponting	do.
Granite for Various Purposes	Leicester Corporation	E. G. Mawbey	do.

CONTRACTS—*Continued.*

Nature of Work or Materials.	By whom Required.	Architect, Surveyor, or Engineer.	Tenders to be delivered.
Improvement Works, Bouthorn-road	Cleator Moor Loc. Bd.	*Official*	Dec. 23
Paving Works and Sewerage, Orchardfield-lane	Leith (N.B.) Twn Coun.	do.	do.
Water Supply Works, Kilchattan Bay	Buteshire C. C.	W. J. Millar	Dec. 27
Pipe Sewer, &c. (1,143 yards), Hayward's Heath	East Sussex C. C.	Henry Card	Dec. 28
*New Block at Workhouse	St. Mary Abbotts, Kensington	T. W. Aldwinckle	do.
Bridge (15 spans), &c. Broomhill, N.B.	Badenoch District Committee	Alex. Mackenzie	Dec. 30
New Streets and Sewering, Fenton (Staffs.)	Wolverhampton Corp.	J. T. Brealey	Jan. 1'94
*Electric Light Station	First Presbyterian Congregation	A. P. Brevitt	do.
Manse, Downpatrick	Islington Vestry	W. & B. Corry	do.
*Urinal	Wellington (Somerset) Gas and Coke Co.	J. P. Barber	do.
Gasholder, Tank, &c.	Chiswick Local Board	*Official*	do.
*Engine and Boiler at Pumping Station	Leith Town Council	do.	Jan. 3
Infectious Diseases Hospital, East Pilton	Rhyl U.S.A.	Mr. Simpson	Jan. 4
*Sewerage Works	Bognor Town Council	B. Latham	Jan. 5
Flint, &c. Road Metal	T. Rymer	Chas. Adcock	Jan. 6
Two Cottages, near Calder Abbey (Cumberland)	.....	Pickering & Crompton	do.
Concert Hall, Newtown Mill, Burnley	.....	G. B. Rawcliffe	No date
Villa Residences, Twickenham	.....	R. F. Anderson	do
*Technical School, Preston	Trustees, Harris Institute	Jas. Aspinall	do.

PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Advertised.	Salary.	Applications to be in.
*Sewage Farm Manager	Keighley Corp.	.....	Dec. 18
*County District Surveyors (3)	Leicester C.C.	200*l.* each	Dec. 27
*Surveyor	Beckenham Loc. Bd.	250*l.*	Jan. 7'94

Those marked with an Asterisk (*) are advertised in this number. *Competitions, p.* iv. *Contracts, pp.* iv., vi. *and* viii., *Public Appointments, pp.* xviii., xix. *and* xxi.

in respect to other parts of the combination by other manufacturers.

Mr. Fletcher Moulton, Q.C., and Mr. J. E. Graham appeared for the plaintiffs; and Mr. Neville, Q.C., M.P., and Mr. Frank Evans for the defendants.

His Lordship, in giving judgment, said that he had come to the conclusion, on the evidence, that the plaintiffs' design was novel and original, having regard to the nature of the subject-matter to which it was applied. He was much impressed in considering the question by the undoubted fact established before him that directly the plaintiffs' design was put on the market it at once acquired considerable popularity and a large sale. The so-called anticipations of that design, so far as proved before him, were never practically sold at all, and, in his opinion, on the evidence, it was established that the plaintiffs' design had distinct advantages over the prior design for similar articles which had been put in evidence on behalf of the defendants. He was of opinion that the plaintiffs had established their case and were entitled to the usual injunction with an inquiry as to damages and the costs of the action.

Judgment accordingly.

MEETINGS.

FRIDAY, DECEMBER 15.

Institution of Civil Engineers (Students' Meeting).—Mr. H. J. Orford on "Continuous Automatic Railway-Brakes." 7.30 p.m.

MONDAY, DECEMBER 18.

Royal Institute of British Architects.—Mr. William Simpson on "The Classical Influence in the Architecture of the Indus Region and Afghanistan." 8 p.m.

Surveyors' Institution.—Mr. E. J. Castle, Q.C., on "The Valuation (Metropolis) Bill, 1893." 8 p.m.

Leeds and Yorkshire Architectural Society — Mr. F. W. Troup on "The Use of Seconds." 7.30 p.m.

TUESDAY, DECEMBER 19.

Institution of Civil Engineers.—Mr. E. B. Ellington on "Hydraulic-power Supply in London." 8 p.m.

A. Lyric Club.—Special Smoking Concert, to be held at St. Martin's Town Hall, Charing Cross. 8 p.m.

Glasgow Architectural Association.—8 p.m.

WEDNESDAY, DECEMBER 20.

Society of Arts. — Adjourned Meeting for further discussion of Mr. Lewis H. Isaacs's paper on "Carriageway Pavements for Large Cities." 8 p.m.

Builders' Foremen and Clerks of Works' Institution.—Annual Meeting of the Directors. 8 p.m.

Liverpool Engineering Society.—Mr. G. L. Burton on "A Tour in South Africa." 8 p.m.

RECENT PATENTS:

ABSTRACTS OF SPECIFICATIONS.

364.—FLUSHING CLOSETS: *J. Merrill.*—According to this invention a syphon trap is fixed at the outlet of the foot pipe, and an air pipe is connected with the outlet syphon and the water level in the flush tank for the purpose of economising the water and securing an efficient flush.

406.—DRAUGHT PREVENTERS: *L. L. Gough.*—According to this invention a strip of wood to which is affixed a strip of baize is employed as the preventer. This is governed by a lever and spring, which lifts the strip clear of the floor when the door is opened, and returns it to its place as the door is closed.

515.—WATER-CLOSETS: *J. Day.*—This invention consists of an arrangement of mechanism and construction which greatly reduces the liability of the closet pipes to foul, and reduces the difference of level between the flushing supply and the outlet syphon.

743.—DOOR BOLTS: *J. Cathrein (Innspruck).*—This is a plan for operating the bolts of a door by means of two cords, which are placed in any part of the room desired. One tassel closes and the other opens the bolt and the door.

6,143.—NAILS OR TACKS: *T. G. Parkinson and others.*—The nails which are the subject of this invention are struck up out of sheet metal and then hammered or further struck into shape. The tacks, &c., are mainly for use in upholstery.

11,809.—STAIR-TREADS, DOOR-STEPS, &c.: *J. Melling.*—A perforated piece of suitable material is, according to this invention, made to fit over small oval or circular blocks of india-rubber, the blocks being kept in place by the perforations. The plate may be changed or moved for the purpose of replacing or renewing the blocks as they become worn.

17,923.—VENTILATORS: *F. and L. Koeffer.*—According to this invention, to facilitate the opening of the flaps, the series is united by a brass rod and controlled with a worm and snail-wheel which operates all the flaps at once.

NEW APPLICATIONS FOR LETTERS PATENT.

NOVEMBER 27.—22,696, J. Mitchell and W. Morrison, Stoves, Register Grates, &c.—22,727, H. Collett, Sanitary Closet Basin and Trap. — 22,730, A. Buecher, Rust-preventive Paints.—22,738, J. Worsfold, Heating Buildings, &c.—22,747, M. Van der Peck, Automatic Flushing Apparatus.

NOVEMBER 28.—22,748, W. Bodin, Flushing Apparatus. —22,781, W. Allen, Water-closets or Water-closet Basins. —22,790, W. Osment, Hanging of Sliding Window Sashes. —22,818, H. Mork, Holding or Supporting Devices for Gas-pipes, &c.—22,873, J. Moore, Step-ladders.—22,892, E. Halmshand, Manufacture of Bricks, Tiles, Paviors and Slabs, with Slag or Granite Chips.—22,897, B. Brameld, Baths and Lavatories.—22,924, T. Mills, Silent Draught-preventing Rolling Doors.—22,935, J. Fenton, Draught-preventers for Doors.—22,940, T. Hildebrand, Roofing Tiles or Plates.—22,961, F. Crane, Paints or Driers.

NOVEMBER 30.—22,978, T. Potter, Fire-resisting Floors.—22,986, T. Atkins, Detachable Sash-lifter Lever.—22,989, E. Ingram, Wood Paving. — 22,991, A. Jones, Door Handles and Catches.—23,012, J. Stephenson and A. Dornan, Sliding Windows.—23,018, L. King, Wood, Tile, and Panel.—23,024, J. Neal, Handle for Tools.—23,033, C. Mathias, Self-closing Doors, Shutters, &c.—23,038, R. Robinson and R. Buck, Brick Cutting Tables.

DECEMBER 1.—23,097, J. Wallace and N. McCreedy, Saw.—23,099, B. Duclos, Iron Buildings.—23,100, F. Dye and J. Wells, Chimney Pots.—23,111, H. Lake, Setting Saws.—23,112, H. Lake, Apparatus for Closing Doors.—23,120, W. Wilson and W. Priest, Manufacture of Paints or Paints Materials.

DECEMBER 2.—23,168, H. Lanchester, Construction of Fireproof Floors, &c.—23,208 and 23,209, W. Allen, Chimney Cowls.

PROVISIONAL SPECIFICATIONS ACCEPTED.

18,798, T. Martin, Pipe Wrenches.—19,681, H. Barrance and E. Simmons, Attachment of Knobs to Spindles.—20,093, A. Marchant, Window Ventilator.—20,180, W. Cruikshanks, Syphons for Cisterns.—20,832, J. Atherton, Waste Water-closets.—21,304, D. McLean, Waste-Preventing Valves for Water-closet Service Cisterns, &c.—21,394, T. W. Keith, Testing and Flushing of Drain-pipes, Soil-pipes, &c.—21,471, W. Lindsay, Treads or Wearing Surfaces for Floors, Staircases, &c.—21,472, W. Wheeler, Siphon Cisterns and Water-waste Preventers.—21,499, A Brown, Water-tight or Fire-proof Doors.—21,562, T. Houghton, Improved Joint to Meeting Rails of Sashes.—21,688, J. Geggie, Window Sashes.—21,867, E. Green, Drain-traps.—21,900, J. Sharp, Fire-grates.—21,907, C. McDonald, Grinding and Working Reciprocating Saws.—21,984, C. Körte, Starting Siphon in Flushing Cisterns.—22,015, J. Lowe, Flooring Cramps.—22,072, J. Slater, Fire-grates.—22,093, W. Bannochie, Fire-grates.—22,103, H. Defries, Window-frames.

COMPLETE SPECIFICATIONS ACCEPTED.
(Open to Opposition for Two Months.)

7,456, J. Whittaker, Brick-presses.—9,131, J. Kunz and A. Hofgraff, Portable Building as a Military Hospital.—19,011, H. Haddan, Process for Finishing Wood Veneers.—20,360, M. Adams, Ventilating and Disinfecting Appliances.—20,814, W. Watson, Man-hole Frames and their Covers.

SOME RECENT SALES OF PROPERTY:

ESTATE EXCHANGE REPORT.

NOVEMBER 29.—By *A. Richards* (at Tottenham): 15 to 25 (odd), Park-lane, Tottenham, f., 1,000*l.*

DECEMBER 4.—By *P. & G. Geen:* Nos. 23, 24, Newington Green, f., r. 84*l.*, 1,250*l.*—By *Norman & Son:* 2 to 16 (even), Lamprell-st., Victoria Pk., and 1, Jodrell-rd., u.t. 83 yrs., g.r. 45*l.* 10s., 300*l.*; 67, Abbey-rd., St. John's Wood, u.t. 57 yrs., g.r. 15*l.*, 810*l.*—By *Walker & Runts:* 10, New-rd., Whitechapel, u.t. 13 yrs., g.r. 4*l.* 10s., 175*l.*; 7, Walden-st., u.t. 10 yrs., g.r. 15*l.*, r. 28*l.*, 42*l.*; 144, Jubilee-st., Mile End, u.t. 15 yrs., g.r. 4*l.*, 92*l.*—By *F. Varley:* Two plots of f. land, Highfield-rd., Bounds' Green, 60*l.*; 18, 20, Compton-st., St. Pancras, u.t. 17 yrs., g.r. 31*l.* 10s., r. 110*l.*, 305*l.*; 168, Fairbridge-rd., Holloway, u.t. 74 yrs., g.r. 6*l.*, r. 26*l.*, 150*l.*; 53, Vorley-rd., u.t. 57 yrs., g.r. 7*l.*, r. 26*l.*, 160*l.*

DECEMBER 5.—By *W. J. Coltman:* 6, Barnet-ter., Leytonstone; f., r. 22*l.*, 230*l.*—By *Debenham, Tewson, & Co.:* 39 to 51 (odd), Highgate-rd., Kentish Town, f., area 32,900 ft., 6,250*l.*; 44, Rushton-st., Hoxton, u.t. 41 yrs., g.r. 4*l.* 15s., r. 40*l.*, 300*l.*—By *Mark Lidl & Son:* 21 to 27 (odd), Bow Lane, Poplar, f., 750*l.*; 31, Zetland-st., Bromley, u.t. 70 yrs., g.r. 4*l.*, 260*l.*; 33, 35, Zetland-st., u.t. 74 yrs., g.r. 8*l.*, 520*l.*; 42, West-av., Walthamstow, u.t. 91 yrs., g.r. 5*l.*, r. 26*l.*, 235*l.*—By *Brougham, Rogers, & Co.:* 13, Boyson-rd., Walworth, u.t. 57 yrs., g.r. 6*l.* 6s., r. 38*l.*, 350*l.*; 70, Inville-rd., u.t. 58 yrs., g.r. 4*l.*, 220*l.*; 101 to 107 (odd), Inville-rd., u.t. 58 yrs., g.r. 21*l.*, 1,115*l.*; 67 to 73, and 109, 111, and 113, Inville-rd., u.t. 58 yrs., g.r. 26*l.* 15s., 1,415*l.*

DECEMBER 6.—By *Ellis, Morris, & Co.:* 24, Aylesford-st., Pimlico, u.t. 44 yrs., g.r. 8*l.*, 350*l.*—By *Jenkins & Sons:* 55, St. Mary's-rd., Peckham, f., r. 32*l.*, 450*l.*; 23, 25, Douglas-st., Deptford, u.t. 58 yrs., g.r. 8*l.* 8s., r. 82*l.* 10s., 585*l.*; 6, Creek-rd., u.t. 45 yrs., g.r. 6*l.*, r. 30*l.*, 110*l.*; 31, Westeria-road, Lewisham, u.t. 75 yrs., g.r. 4*l.*, r. 24*l.*, 180*l.*—By *A. & H. Potter:* 4, Chapel Row, Willesden, f., 130*l.*; 4, 5, Bridge-st., Kilburn, u.t. 65 yrs., g.r. 10*l.*, r. 58*l.*, 320*l.*; 69, Brondesbury-rd., u.t. 86 yrs., g.r. 10*l.* 10s., r. 60*l.*, 450*l.*—By *D. Young:* L.g.r. of 99*l.* 6s., Stewart's-rd., &c., Wandsworth-rd., u.t. 84 yrs., g.r. 30*l.* 10s., 1,300*l.*; 14, 16, 28 or 36 (even), Arlington-rd., Ealing, f., r. 196*l.*, 2,515*l.*; a plot of f. land, Arlington-rd., 70*l.*; 10, Victor Parade, Harrow-rd., f., r. 60*l.*, 760*l.*; 9, Victor Parade, f., r. 40*l.*, 460*l.*; 15, Secker-st., Waterloo-rd., u.t. 29 yrs., g.r. 6*l.* 10s., r. 430*l.*, 200*l.*—By *W. A. Blakemore:* 17, 19, 53, 55, 57, Mayfield-rd., Walthamstow, f., 550*l.*; 1, 2, 3, Prospect Cottages, f., 420*l.*; 188 to 190, West Green-rd., Tottenham, f., r. 52*l.*, 855*l.*; 486, 488, West Green-rd., f., r. 49*l.*, 720*l.*; f.g.r. of 12*l.*, West Green-rd., reversion in 74 yrs., 240*l.*; "Mary's Cottage" and garden, f., 185*l.*; 44 to 58 (even), Willow-rd., f., 1,055*l.*; 44, Cornwall-rd., Westbourne-pk., u.t. 69 yrs., g.r. 13*l.*, r. 75*l.*, 550*l.*

DECEMBER 7.—By *H. J. Bromley*: Two f. houses with builder's premises, Chapel-rd., Norwood; and 1 to 5, Orchard cottages, 1,680*l.*—By *Holcombe & Betts*: 51, St. James's-sq., Notting Hill, f., r. 50*l.*, 690*l.*—By *Newbon & Co.*: F.g.r. of 10*l.*, Bath-rd., Chiswick, reversions in 81 yrs., 255*l.*; f.g.r. of 10*l.*, Waldo-rd., Kensal Green, ditto in 81 yrs., 235*l.*; f.g.r. of 20*l.*, Hoxton-st., Hoxton, ditto in 27 yrs., 950*l.*—By *W. T. Marsh*: 12, Clifton Villas, Maida Vale, u.t. 48 yrs., g.r 10*l.*, 700*l.*—By *Rouch & Parkhouse*: 2, Hugo-rd., Tufnell Park, u.t. 75 yrs., g.r. 6*l.*, 355*l.*—By *Foster & Cranfield*: 79, 81, Glenarm-rd., Hackney, and plot of land, f., 560*l.*—By *Messrs. Chadwick*: 69, Robert-st., Hampstead-rd., u.t. 29 yrs., g.r. 4*l.*, r. 50*l.*, 435*l.*; i.g.r. of 64*l.* 2s., Drummond-st., u.t. 25½ yrs., g.r. 11*l.*, 810*l.*; i.g.r. of 317*l.*, George-st., u.t. 29½ yrs., g.r. 69*l.*, 2,640*l.*; i.g.r. of 56*l.*, u.t. 16½ yrs., g.r. 29*l.*, 215*l.*; i.g.r. of 109*l.* 8s., u.t. 25¾ yrs., g.r. 27*l.* 8s., 885*l.*; i.g.r. of 35*l.*, Euston-st., u.t. 25¾ yrs., g.r. 10s., 330*l.*; i.g.r. of 20*l.*, Cobourg-rd., u.t. 25¾ yrs., g.r. 6*l.*, 140*l.*; i.g.r. of 75*l.*, William-st., u.t. 28 yrs., g.r. 19*l.*, 595*l.*; i.g.r. of 90*l.* 18s., Munster-sq., &c., u.t. 28½ yrs., g.r. 41*l.* 6s., 450*l.*; i.g.r. of 248*l.*, Clarence Gardens, &c., u.t. 29½ yrs., g.r. 74*l.* 12s. 6d., 1,670*l.*; i.g.r. of 96*l.* 6s. 6d., Robert-st., u.t. 29½ yrs., g.r. 32*l.*, 650*l.*; i.g.r. of 186*l.* 8s., Red Hill-st., &c., u.t. 29¾ yrs., g.r. 60*l.*, 1,245*l.*; i.g.r. of 183*l.*, Princess-st., u.t. 28 yrs., g.r. 60*l.*, 1,210*l.*; i.g.r. of 21*l.*, Little Grove-st., u.t. 28 yrs., g.r. 6*l.*, 140*l.*—By *W. Bradley* (at Woolwich): 137, Parkdale-rd., Plumstead, f., 370*l.*

DECEMBER 8.—By *W. B. Hallett*: 75, Oakfield-rd., Penge, f., r. 42*l.*, 550*l.*; No. 427, Holloway-rd., u.t. 28 yrs., g.r. 7*l.*, r. 40*l.*, 560*l.*—By *G. A. Wilkinson & Son*: 168, 170, Seven Sisters'-rd., Stamford Hill, u.t. 82 yrs., g.r. 8*l.* 8s., r. 105*l.*, 485*l.*; 59, 61, Warwick Gardens, Kensington, u.t. 56 yrs., g.r. 15*l.*, r. 165*l.*, 1,545*l.*—By *Green & Son*: 2 and 4, Trinity-rd., Penge, f., r. 57*l.*, 830*l.*; 6 to 58 (even), Trinity-rd., f., 4,195*l.*; 31 to 45 (odd), Trinity-rd., f., 1,395*l.*; "Fir Villa," Crampton-rd., f., 285*l.*; 68 and 71, Kingswood-rd., f., 645*l.*: 55 to 67 (odd), Kingswood-rd., f., 1,490*l.*; 71 to 79, Ridsdale-rd., f., 510*l.*; 140, 142, and 144, and stabling, Gipsy Hill, u.t. 76 yrs., g.r. 21*l.*, r. 73*l.* 12s., 430*l.*

[*Contractions used in these Lists.*—F.g.r. for freehold ground-rent; l.g.r. for leasehold ground-rent; i.g.r. for improved ground-rent; g.r. for ground rent; r. for rent; f. for freehold; c. for copyhold; l. for leasehold; e.r. for estimated rental; u.t. for unexpired term; p.a. for per annum; yrs. for years; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; cres. for crescent; yd. for yard, &c.]

PRICES CURRENT OF MATERIALS.

TIMBER.		
Greenheart, B.G.	ton	9/0/0 0/0/0
Teak, E.I.	load	9/10/0 15/10/0
Sequoia, U.S.ft.cu		2/3 2/6
Ash, Canada load		2/10/0 3/15/0
Birch, do.		2/19/0 3/10/0
Elm, do.		3/5/0 4/10/0
Fir, Dantsic, &c.		1/5/0 2/10/0
Oak, do.		2/15/0 5/0/0
Canada		5/10/0 7/0/0
Pine, Canada red		2/15/0 3/5/0
Do. Yellow		2/5/0 4/10/0
Lath, D'ntsic, fath		4/10/0 5/10/0
St. Petersburg		5/0/0 6/10/0
Wainscot, Riga, &c., log		2/5/0 4/10/0
Odessa, crown		2/5/0 4/10/0
Deals, Finland 2nd & 1st std		8/0/0 10/10/0
Do. 4th & 3rd		7/10/0 8/0/0
Do. Riga		7/10/0 9/0/0
St. Petersburg, 1st yellow		10/0/0 13/10/0
Do. 2nd yellow		8/0/0 9/0/0
Do. white		8/10/0 11/0/0
Swedish		8/0/0 16/0/0
White Sea		8/0/0 16/10/0
Canada, Pine 1st		22/10/0 29/10/0
Do. do. 2nd		17/0/0 18/10/0
Do. do. 3rd &c.		7/10/0 10/10/0
Do. Spruce, 1st		9/0/0 11/0/0
Do. do. 3rd & 2nd		6/10/0 7/15/0
New Brunswick		6/0/0 7/5/0
Battens, all kinds		3/0/0 15/0/0
Flooring boards, sq., 1 in. prep. 1st		0/10/6 0/15/0
Do. 2nd		0/7/6 0/13/0
Other qualities—		0/5/3 0/7/0
Cedar, Cuba ..ft.		/4 /4½
Honduras, ..&c		/3½ /4½
Mahogany, Cuba		/3½ /6
St. Domingo, cargo av.		/3 1/6
Mexican do. do.		/3½ /4
Tobasco do. do.		/3½ /6
Honduras do. ..		/4 /5½
Box, Turkey ton		4/0/0 13/0/0
Rosa, Rio		8/0/0 20/0/0
Bahia		7/0/0 18/0/0
Satin, St. Domingo		0/0/6 0/1/3

TIMBER (*continued*).		
Satin, Porto Rico		0/0/7 0/1/6
Walnut, Italian		0/0/3½ 0/0/7

METALS.		
Iron—Pig, in Scotland	ton	2/3/9 0/0/0
Bar, Welsh, in London		5/17/6 6/0/0
Do. do. at works in Wales		5/7/6 5/10/0
Do. Staffordshire, in London		6/0/0 6/10/0
COPPER—British cake and ingot		46/5/0 46/10/0
Best selected		47/0/0 47/10/0
Sheets, strong		55/0/0 0/0/0
Chili, bars		43/7/6 43/12.6
YELLOW METAL	ld	0/0/4½ 0/0/5
LEAD—Pig, Spanish	ton	9/8/9 9/10/0
English com. brands		9/12/6 0/0/0
Sheet, English, 6 lbs. per sq. ft. and upwards		11/0/0 0/0/0
Pipe		11/10/0 0/0/0
ZINC—English sheet	ton	20/15/0 0/0/0
Vieille Montagne		21/5/0 0/0/0
Rapeseed, English pale		23/0/0 23/5/0
Do. brown		21/10/0 0/0/0
Cottonseed ref.		20/10/0 21/0/0
Oleine		22/0/0 24/0/0
Lubricating, U.S.		4/0/0 5/0/0
Do. refined		5/0/0 12/0/0
TAR—Stockholm	barrel	0/18/6 0/19/0
Archangel		0/12/6 0/0/0

OILS.		
Linseed	ton	20/0/0 20/2/6
Cocoanut, Cochin		35/0/0 0/0/0
Do. Ceylon		26/15/0 0/0/0
Palm, Lagos		26/0/0 26 12/0

TENDERS.

[Communications for insertion under this heading should be addressed to "The Editor," and must reach us *not later than* 10 *a.m. on Thursdays.*]

ASPATRIA (Cumberland).—For the erection of new schools, boundary walls, and master's house, for the Aspatria and Brayton School Board. Messrs. Moffat & Rentley, architects, Whitehaven and Manchester. Quantities supplied:—

William Beaty	£6,806	0	0
Joseph Coulthard	6,406	16	1
S. McWhinney	6,294	6	9
James J. Wilson	6,090	9	10
Lance Ferguson	6,083	16	8½
Gray, Mason, & Co.	5,761	16	6
Smith & Marshall	£5,276	0	0
Lister, McCartney, & Lister	5,181	11	8
Maxwell & Toppin			
Aspatria*	4,942	3	8

*Accepted.

BARNES.—For rebuilding stables at the Red Lion Hotel, Barnes, for Messrs. Llewellyn. Mr. Edward Maynard, architect, College-chambers, Richmond:—

Sweet & Loder	£1,479	Lillywhite	£1,285
Lansdowne & Co.	1,393	Hunt (accepted)	1,205
Prince Bros.	1,321		

BRADFORD (Yorks.).—For the erection of three shops, Manchester-road. Messrs. Fairbank & Wall, architects, Craven Bank-chambers, Bradford:—

Mason.—Phineas Drake	£905	0	0
Joiner.—W. G. Bogg	422	0	0
Shop Fitters.—Carr Bros.	120	0	0
Plumber.—R. Townend	225	0	0
Plasterer.—John Leman	80	10	0
Slaters.—Hitt & Nelson	42	0	0
Painters.—Wm. Hird & Son	55	0	0
Ironfounders.—E. & W. H. Haley	125	0	0
	£1,974	10	0

BRADFORD (Yorks.).—For the erection of Wesleyan chapel and Schools, Summerbridge. Mr. W. J. Morley, architect, 269, Swan Arcade, Bradford:—

Masons' work.—Alderman Simpson, Harrogate	Total £1,974	
Joiners' work.—Settle, Summerbridge		
Plumbers' work.—Lindley, Leeds		
Plasterers' work.—Laycock, Harrogate		
Slaters' work.—Baynes, Harrogate		
Painters' work.—Varley & Roebuck, Thornton		

CAMBRIDGE.—Accepted for the erection of a pair of residences, Lyndenode-road, for Mr. Alfred Kett. Mr. Frank Waters, architect, Cambridge:—

W. Saint, Cambridge	£1,543	0	0

[No competition.]

CAVERSHAM (Oxon).—For excavating, road-making, &c., Caversham Hill, for the Local Board:—

Free & Sons	£455	0	
A. Bridgeman	450	0	
F. Talbot	360	0	
Collier & Catley	£346	0	
G. S. Lewis, Reading*	316	12	

*Accepted.

[Surveyor's estimate, £342.]

COVENTRY.—For carrying out additions to Messrs. Pool, Lorrimer, & Tabberer's factory at Foleshill, near Coventry. Mr. T. F. Tickner, architect, 7, Bishop-street, Coventry:—

W. Starkie	£1,354	W. H. Littler	£1,080
W. Hanson	1,350	C. Garlick	1,070
T. & H. Herbert	1,325	E. Kelley	1,020
C. Haywood	1,190	C. Wright	1,017
W. Marston	1,117	D. Clarke, Foleshill*	925
T. Glover & Son	1,110		

*Accepted.

DORCHESTER.—Accepted for the supply of about 800 cubic yards of rough gravel, &c., for the Town Council. Mr. C. J. Hunt, Borough Surveyor, Dorchester:—

	Broken Gravel. Per ton.	Fine Gravel. Per ton.
Moreton Sand and Gravel Co., Moreton Station, near Dorchester	4s. 1d.	3s. 9d.

Delivered at Dorchester Station.

DROITWICH.—For the supply of 2,000 yds. blue vitrified kerb; also Rowley Rag cubes, for the Corporation. Mr. B. Godfrey, Borough Surveyor, Droitwich:—

Kerb.

J. T. Wood & Bros., Wordsley .....6s. per doz. pieces.

[13 other tenders, ranging from 5s. 10d. to 9s. per doz.]

Setts.

A. Allen, Worcester .....14s. 3d. per ton.

[4 other tenders at 14s. 6d. per ton.]

EALING.—For the electric lighting station, Ealing. Mr. Charles Jones, Engineer, Public Buildings, Ealing:—

W. Gibbin & Son	£9,780	0	1½
J. Mowlem & Co.	8,662	0	0
S. & W. Pattinson	8,584	0	0
W. H. Lorden & Son	8,461	0	0
J. Allen & Sons	£8,426	13	0
J. Dorey & Co.	7,900	0	0
Henry Vernon	7,610	6	10
Wilkinson Bros.*	7,381	0	0

* Accepted.

GOSPORT (Hants).—For the erection of new voluntary schools, for the Gosport and Alverstoke School Council. Mr. Harry A. F. Smith, architect, Star Chambers, Gosport:—

W. Lowe & Son	£4,531	0	0
W. Light & Son	4,300	0	0
W. Ward	4,250	0	0
J. Barton	4,114	0	0
J. Croad	4,080	0	0
T. P. Hall	3,900	0	0
J. Dugan	£3,838	0	0
Wm. Rapley & Son	3,657	6	10
H. J. Evans	3,644	0	0
W. E. Lane & Son, Gosport (accepted)	3,489	9	6

GREAT TOTHAM (Essex).—For the enlargement, &c., of school buildings, &c., for the School Board. Mr. Chas. Pertwee, architect, Chelmsford:—

W. E. Letch	£260	John Gozzett	£220
Hy. Potter	230	Josh. Smith	216
Thos. Wilding	225	Ward, Great Totham*	210

* Accepted.

HARROW-ON-THE-HILL.—For additions to Langdale House. Mr. J. S. Blake, surveyor:—

Joseph Dorey	£402	0	0
F. T. Chinchen	385	7	6
A. Potter	£302	0	0

IPSWICH.—For about ninety tons of 9-in. c.i. pipes, with five tons of connexions, for the Corporation. Mr. H. Roberts, engineer, Waterworks, Ipswich:—

	9-in. Pipes. Per ton.	Connexions. Per ton.
J. Romans & Son	£5 3 6	£10 10 0
Newton Chambers	5 0 0	7 0 0
E. & W. Haley	4 17 6	8 15 0
Laidlaw & Son	4 15 0	10 0 0
Silverters	4 13 6	8 12 6
Clay Cross Iron Co.	4 11 8	8 5 0
J. & S. Roberts	4 11 3	8 0 0
Hampton & Co.	4 10 6	8 3 6
Cochrane Grove	4 10 0	8 10 0
Firmstown Bros.	4 7 6	8 0 0
Birtley Iron Co.	4 7 0	8 6 0
C. S. Mallett & Co.	4 5 0	8 0 0
J. Gibbs & Co.	4 5 0	8 0 0
Cochrane & Co.	4 5 0	8 5 0
Oaks & Co.	4 5 0	8 0 0
J. Skelton & Co.	4 4 11	8 0 0
Staveley Iron Co.	4 5 0	8 0 0
Stanton Iron Co., near Nottingham*	4 4 0	8 0 0

* Accepted.

LIMAVADY (Ireland).—For providing and laying seventy tons c.i. water-pipes, Dungiven, for the Union Guardians. Mr. L. L. Macassey, C.E., Belfast:—

Work and Material.—Daniel Christin, Coleraine	£1,070	10	11
Work and Material.—R. Rogers, Limavady	1,063	0	8
Work and Material.—Deceny, Dungiven	1,044	0	4
Work and Material.—W. Williamson, Coleraine	846	11	7
Work.—James McLarnon, Belfast (accepted)	680	0	0
Material.—Pime, Belfast	475	15	0
Work.—Raynor, Holywood	401	3	9
Material.—Brown & Son, Londonderry	376	0	0

LONDON.—For rebuilding the boys', girls', and infants' offices, in connexion with the Central-street School, St. Luke's, and for providing a new system of drainage, for the School Board for London. Mr. T. J. Bailey, Architect:—

G. S. & W. Williams & Son	£1,039	0	
E. Houghton & Sons	957	0	
H. Knight & Sons, Tottenham*	£810	10	

* Recommended by the Works Committee for acceptance.

LONDON.—For erecting a deaf centre and a laundry centre on the site in Stanhope-street; and also for enclosing, draining, and tar-paving the additional land which has been acquired, for the School Board for London. Mr. T. J. Bailey, Architect:—

		For brickwork in cement, add.
G Lyford	£2,366 17 3	£24 15 0
McCormick & Sons	2,142 0 0	26 0 0
A. Salter	2,102 0 0	30 0 0
Cowley & Drake	2,095 0 0	34 10 0
H. Knight & Sons	2,032 0 0	30 10 0
F. G. Minter	1,938 0 0	35 0 0
E. Houghton & Sons, Stroud Green, N.*	1,880 0 0	29 0 0

* Recommended by the Works Committee for acceptance.

LONDON.—For exterior cleaning, &c., at Middle-row Schools, for the School Board for London. Mr. T. J. Bailey, Architect:—

Eady	£212	5	0
Cowley & Drake	178	4	6
Sealey	176	10	0
Marchant & Hirst	£169	0	0
F. T. Chinchen*	159	0	0

* Accepted.

LONDON.—For removing four partitions on the first floor, and two on the second floor, of the Old Castle-street School, Whitechapel, and providing and fixing six new glazed partitions in lieu of them, for the School Board for London:—

W. Neil	£714	0	
D. Gibb & Co.	288	10	
J. T. Robey	280	0	
F. J. Coxhead	241	0	
W. Gregar & Son	£228	0	
Calnan & Co., Commercial-road*	182	10	

* Recommended by the Works Committee for acceptance.

LONDON.—For rebuilding the boys' offices at the London Fields School at a further distance from the school building, and for making the necessary connexions to the existing drainage, for the School Board for London. Mr. T. J. Bailey, Architect:—

G. S. S. Williams & Son	£233		
McCormick & Sons	187		
White & Son	170		
Stevens Bros., Finsbury-park, N.*	£156		

* Recommended by the Works Committee for acceptance.

LONDON.—For erecting a manual training centre on the site in Gainsborough-road, Hackney Wick; for converting the room at present used for this purpose into a laundry centre; and for altering the covered playgrounds, for the School Board for London. Mr. T. J. Bailey, Architect:—

		For brickwork in cement, add.
E. Proctor	£1,128 18 0	£7 15 0
F. G. Minter	1,115 0 0	14 0 0
McCormick & Sons	1,114 0 0	10 0 0
Wm. Gregar & Sons	1,019 0 0	20 0 0
E. Houghton & Son, Stroud Green, N.*	903 0 0	9 0 0

* Recommended by the Works Committee for acceptance.

LONDON.—For interior cleaning and painting at the Oxford Gardens Schools, Notting Hill, for the School Board for London:—

Lyford	£229	0	
Sealey	150	0	
Macey & Son	148	0	
Peattie & Axtile	143	0	
Eady	127	4	
Polden	£115	0	
Clifton	110	0	
Head & Son	96	5	
F. T. Chinchen*	94	0	

*Accepted.

LONDON.—For interior cleaning, &c., at the Worington-road School, for the School Board for London. Mr. T. J. Bailey, Architect:—

Eady	£350	0	
Cowley & Drake	291	0	
S. Polden	290	0	
Clifton	£248	0	
Head & Sons	228	13	
F. T. Chinchen*	219	17	

*Accepted.

LONDON.—For interior cleaning at Buckingham-road Schools, for the School Board for London:—

Peattie & Axtile	£215	0	
Polden	189	0	
Cowley & Drake	168	5	
Lyford	£136	0	
F. T. Chinchen	125	11	
Head & Son	123	5	

LONDON.—For interior cleaning at Kenmont Gardens, for the School Board for London:—

Lyford	£271	2	8
Peattie & Axtile	168	0	0
Cowley & Drake	133	16	8
F. T. Chinchen	£124	0	0
Marchant & Hirst	118	0	0

LONDON.—For the erection of business premises in St. Mary Axe, for the Governors of Christ's Hospital. Mr. Henry S. Legg, architect. Quantities by Mr. H. W. Theobalds:—

Perry & Co.	£3,750	Nightingale	£3,393
Bywaters & Sons	3,507	Charteris	3,362
Ashby Bros.	3,493	Hall, Beddall, & Co.	3,330
Dove Bros.	3,445		

LONDON.—For walls, gates, and fences, at the cemetery, Willesden-lane, for the Acton Local Board. Mr. D. J. Ebbetts, architect:—

J. Dorey & Co.	£1,412	0	0
G. Lyford	1,351	3	6
W. A. Pryor	1,320	0	0
W. J. Burns	1,267	17	0
Rochdale, Gover, & Smith	1,252	17	5
J. S. Davis	1,248	15	0
J. Honour & Son	1,192	15	0
Penny & Co.	£1,190	0	0
D. Cronin	1,150	0	6
T. Nye	1,064	0	0
H. Morecroft	1,063	3	0
T. Bendon	1,061	5	8
S. Hipwell, Wisbech*	1,015	15	0

*Accepted.

LONDON.—For excavating and constructing an underground water-tank at the station in King's-road, Camden Town, for the Vestry of St. Pancras. Professor Henry Robinson, C.E., 13, Victoria-street, London:—

Holme & King	£1,262	Ballard	£1,080
Mowlem & Co.	1,244	Mellor	1,076
Kelly Bros.	1,195	Jackson & Son	1,055
Bedford Pitcher	1,143	Killingback & Co.*	902

*Accepted.

LONDON.—For cemetery chapels, Willesden-lane, for the Acton Local Board. Mr. D. J. Ebbetts, architect:—

		Extra for Stone.
G. Lyford	£3,564 16 11	£829 18 8
W. Richardson	3,378 0 0	134 9 9
T. Bendon	3,023 17 0	679 0 0
R. Ballard	2,909 0 0	242 0 0
Rochelle, Gover, & Smith	2,721 2 11	468 15 10
G. Wimpey & Co.	2,718 4 5	292 0 6
G. Hooper	2,685 18 11	361 16 0
J. Dorey & Co., Brentford*	2,734 0 0	67 0 0

*Accepted.

LONDON.—Accepted for erecting sick horse infirmary, for the Vestry of St. Mary Abbots, Kensington, W. Mr. William Weaver, architect:—

Buckeridge Bros., Kensington £467 17 0

Five other tenders.

LONDON.—Accepted for alterations, additions, &c., to house at Vestry's depôt, for the Vestry of St. Mary Abbots, Kensington, W. Mr. William Weaver, architect:—

Buckeridge Bros., Kensington £275 10 6

Five other tenders.

LONDON.—For re-building Heath's Livery Stables, Hans-road, Kensington, S.W., for Mr. Archibald Grove, M.P. Mr. Basil Slade, architect, 3, Grosvenor-street, W. Quantities supplied by Messrs. Dunk & Bousfield, Billiter-square-buildings, E.C.:—

Wetherilt, Lee, & Martin	£2,355	Gregory & Co.	£2,177
Aldin Bros.	2,230	S. Heath	2,049
Chas. Heath	2,225	Munday & Son	2,016
Bush & Sons	2,189		

LONDON.—Accepted for the erection of two warehouses, for Mrs. Brown. Mr. R. A. Rix, architect and surveyor, 26, Budge-row, City:—

J. Holmes, Terrace-road, South Hackney.....£205 0 0

LONDON.—For repairs and decorations to the "Albion Tavern," Lauriston-road, South Hackney for Mr. C. Holland:—

Harvey Walworth	£202	10	J. Holmes, Terrace-road, South Hackney*
Dixon	196	0	£188 15

* Accepted.

LONDON.—Accepted for new water-closets and sanitary work at St. Matthews Schools, Canonbury:—
Hoskins, Westminster £228 0 0

NEWCASTLE-ON-TYNE.—For the construction of foundations, City Asylum extension, Gosforth, for the Visiting Committee. Mr. J. W. Dyson, architect, 18, Granger-street, Newcastle-on-Tyne. Quantities by Mr. George Connell, 42, Grainger-street, Newcastle:—

Kirk & Brown.	J. E. Simpson.
W. C. Tyrie.	D. N. Brims.
J. L. Millar.	John Ferguson, Newcastle.*
J. & W. Lowry.	Jos. Elliott.

* Accepted on schedule of prices. Comparative approximate estimates ranged from £9,000 to over £13,000.

SOUTHAMPTON.—For road-making, kerbing, channelling, and fencing on the Bevais Hill House Estate. Mr. William Burrough Hill, F.S.I., surveyor, Southampton:—

Joseph Butt	£291 15	F. Osman	£274 0
Crook & Batten	277 0		

SUTTON (Surrey).—For making up Lewis and Burnell-roads, or the Sutton Local Board. Mr. Albert D. Greatorex, C.E., Surveyor:—

Lewis-road.

E. Iles	£451 13 6	J. B. Potter	£424 0 0
W. Langridge.....	444 7 10	G. Osenton	391 19 6
R. Ballard.....	439 6 6	Mayo & Co.	357 19 6
G. Whimpey	431 0 0	G. Burrage	337 10 0
J. Mowlem & Co.....	429 4 10	W. Jenner	324 5 8
T. Adams.....	425 9 0	W. H. Wheeler	311 14 6

[Surveyor's estimate, £400.]

Burnell-road.

J. B. Potter	£353 0 0	J. Mowlem & Co.	£295 6 8
E. Iles	331 15 6	G. Osenton	250 9 2
W. Langridge	320 1 3	G. Burrage	241 11 0
T. Adams.....	314 3 0	Mayo & Co.	237 16 7
G. Wimpey & Co. ...	312 10 0	W. Jenner	226 4 11
R. Ballard	308 13 11	W. H. Wheeler	220 5 2

[Surveyor's estimate, £283.]

WATFORD.—For the supply of paving slabs for eight new streets, for the Local Board:—
Patent Victoria Stone Company, 283A, Kingsland-road, London, 3s. 9½d. per yard super.

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Royal Academy Exhibitor. 1903.

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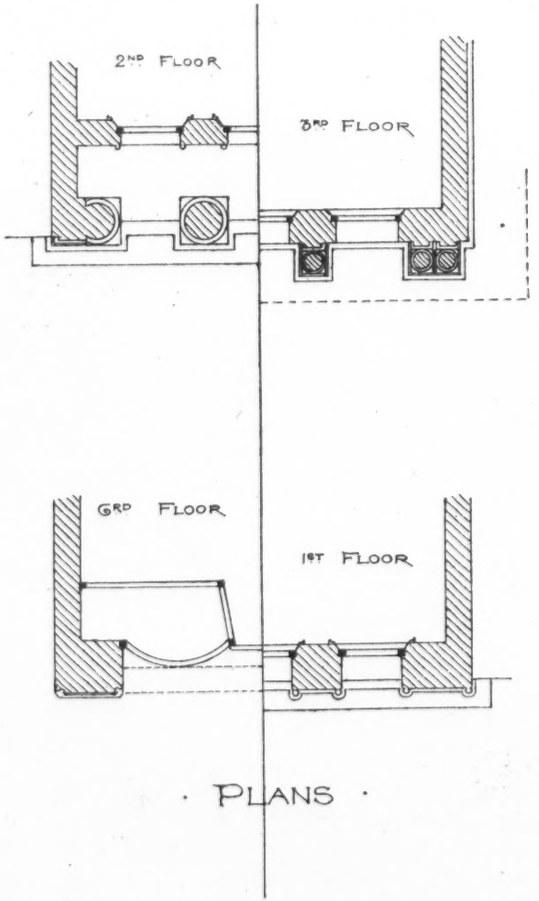

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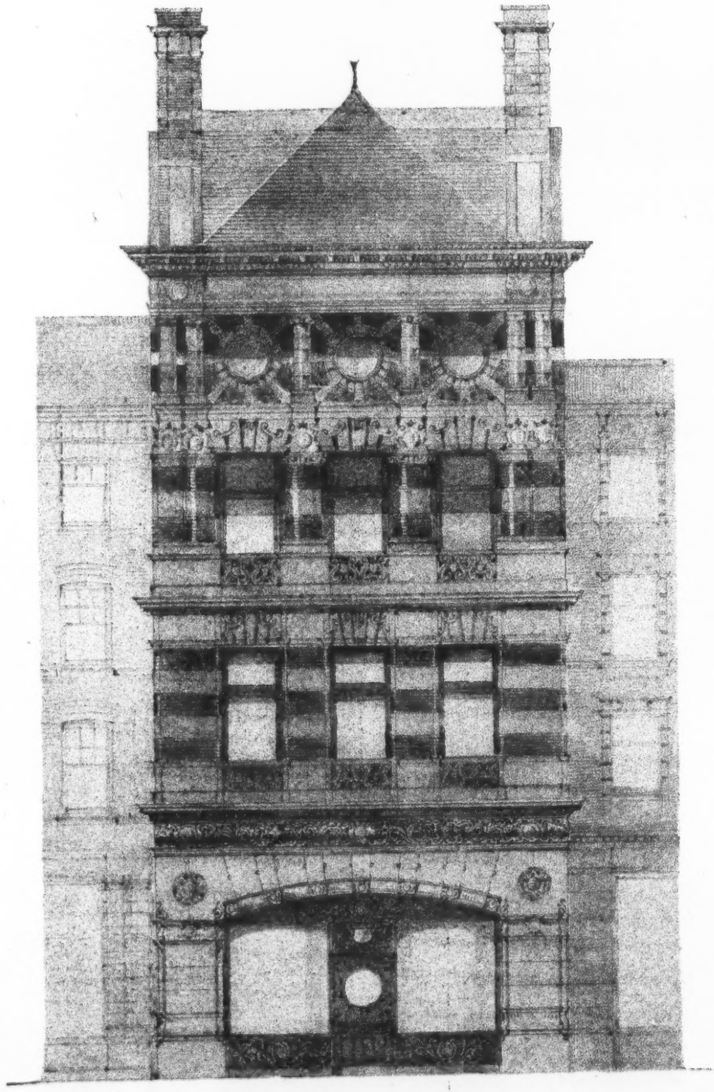

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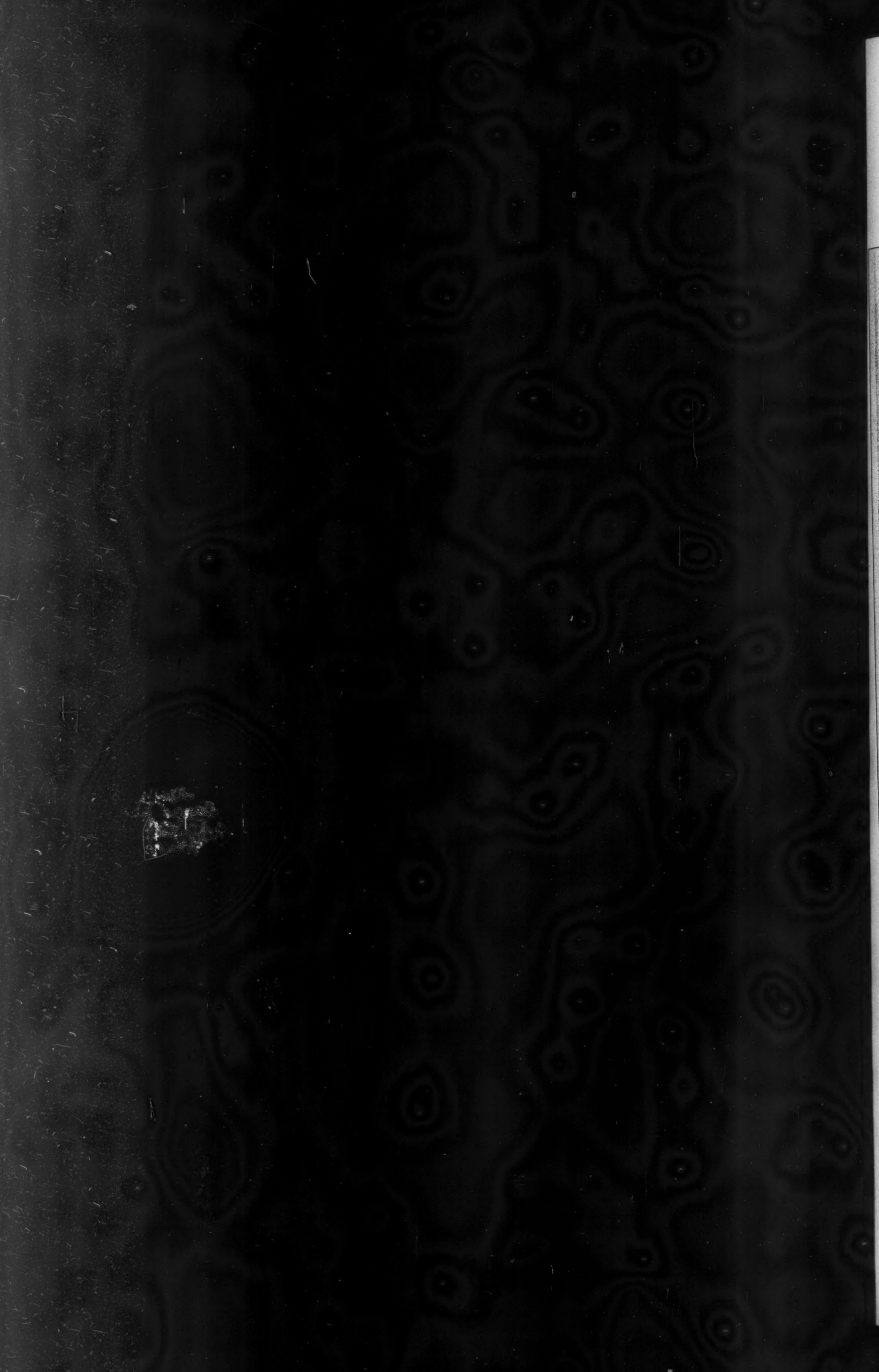

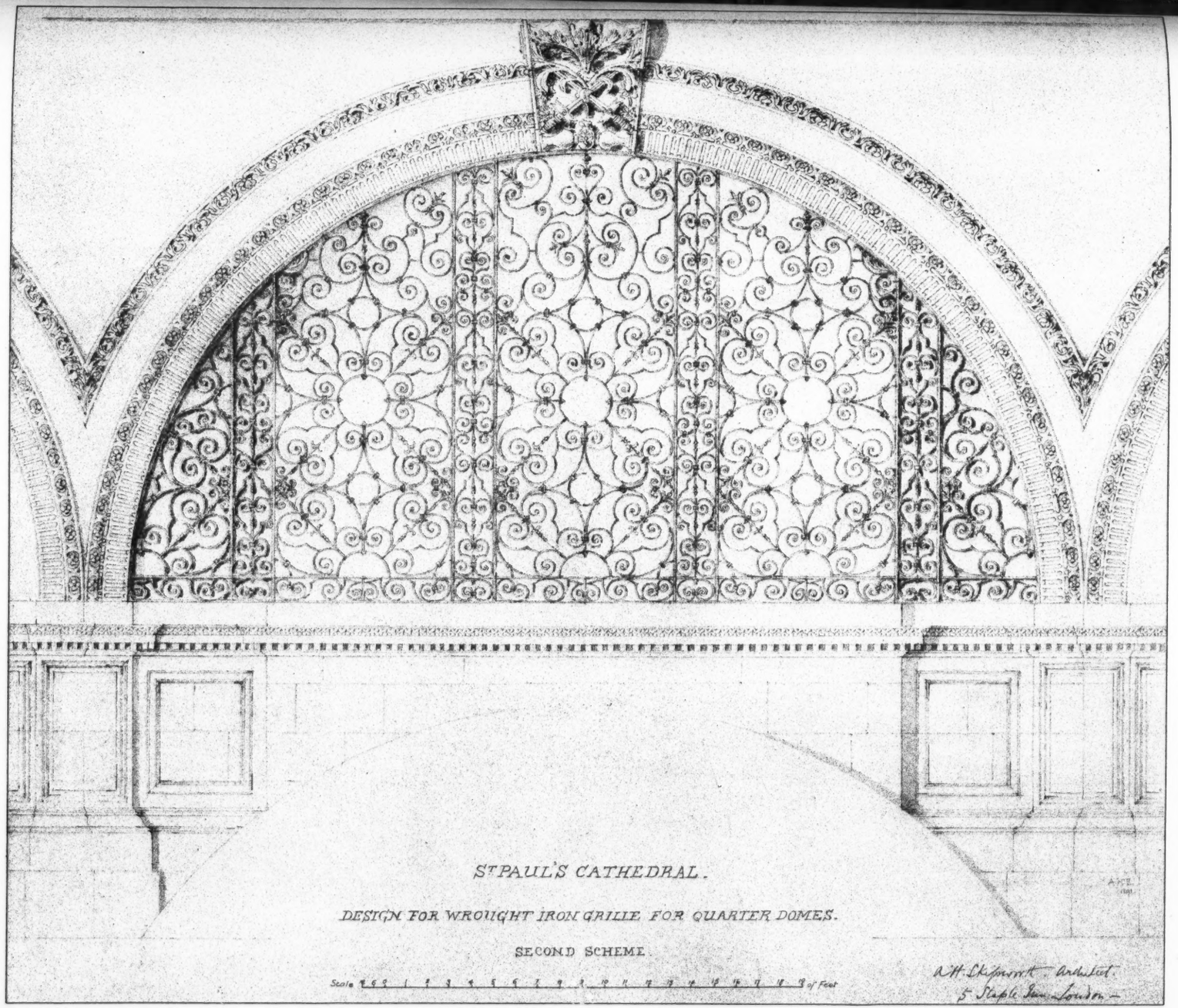

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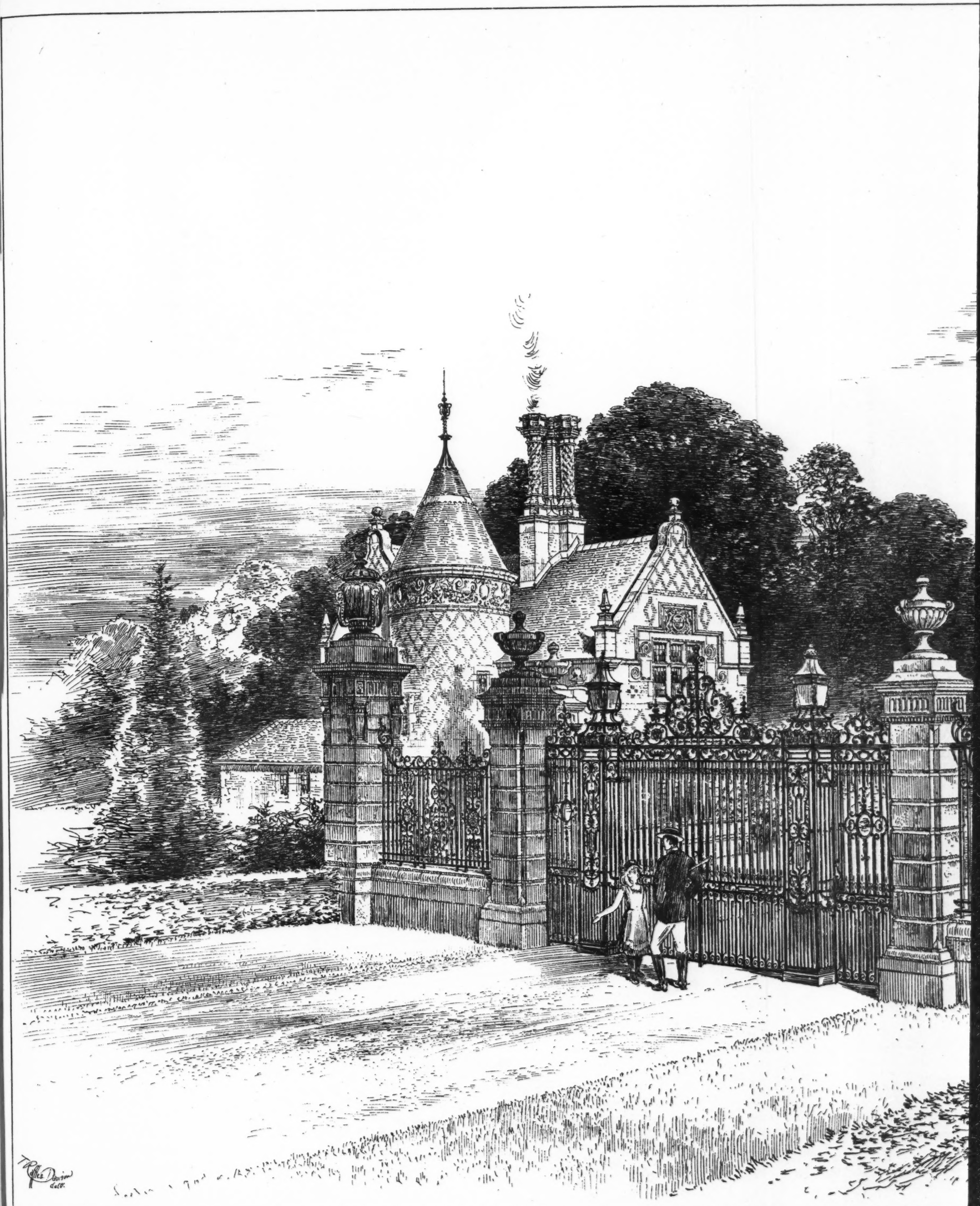

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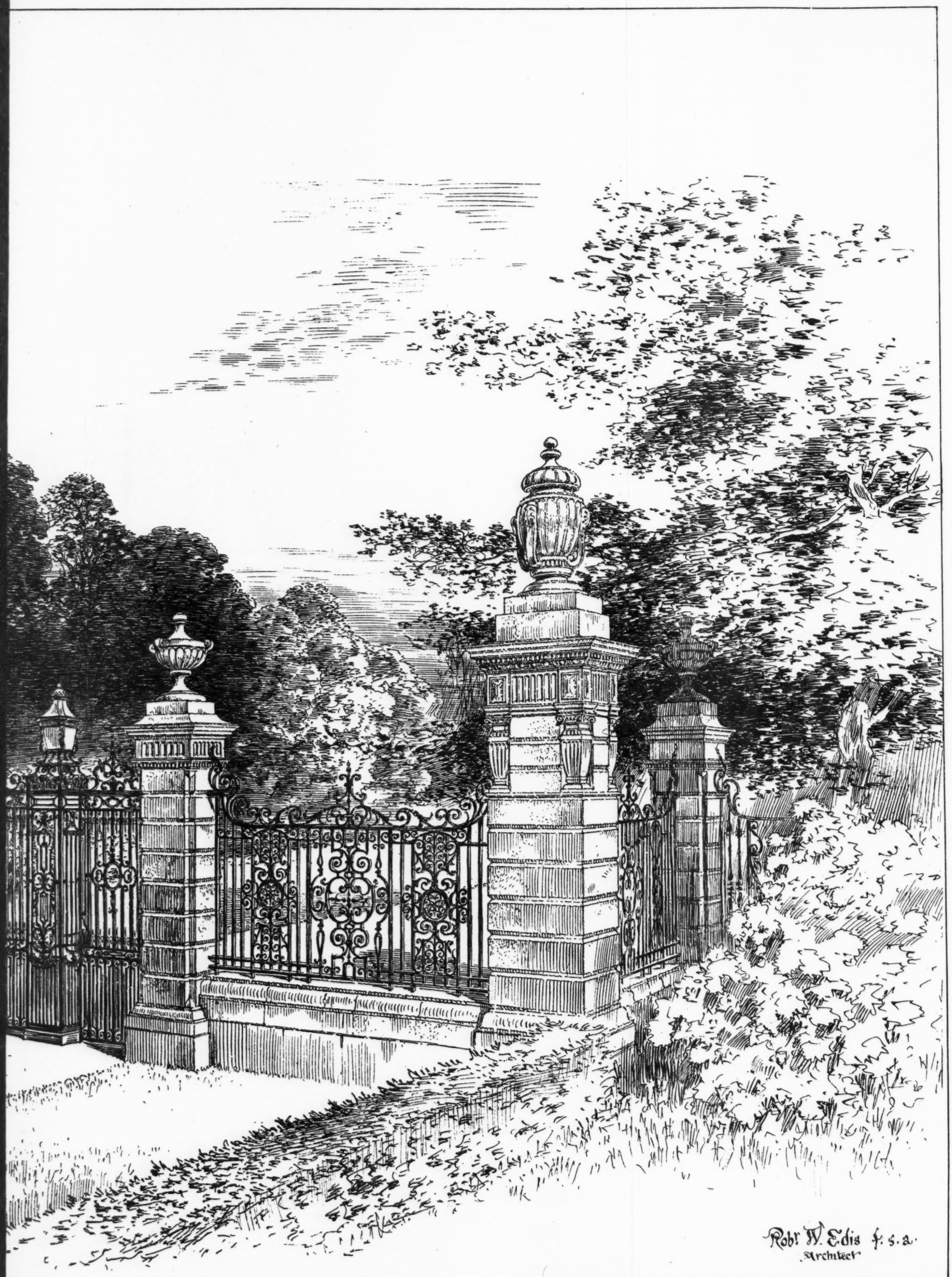
Academy Exhibition, 1893.



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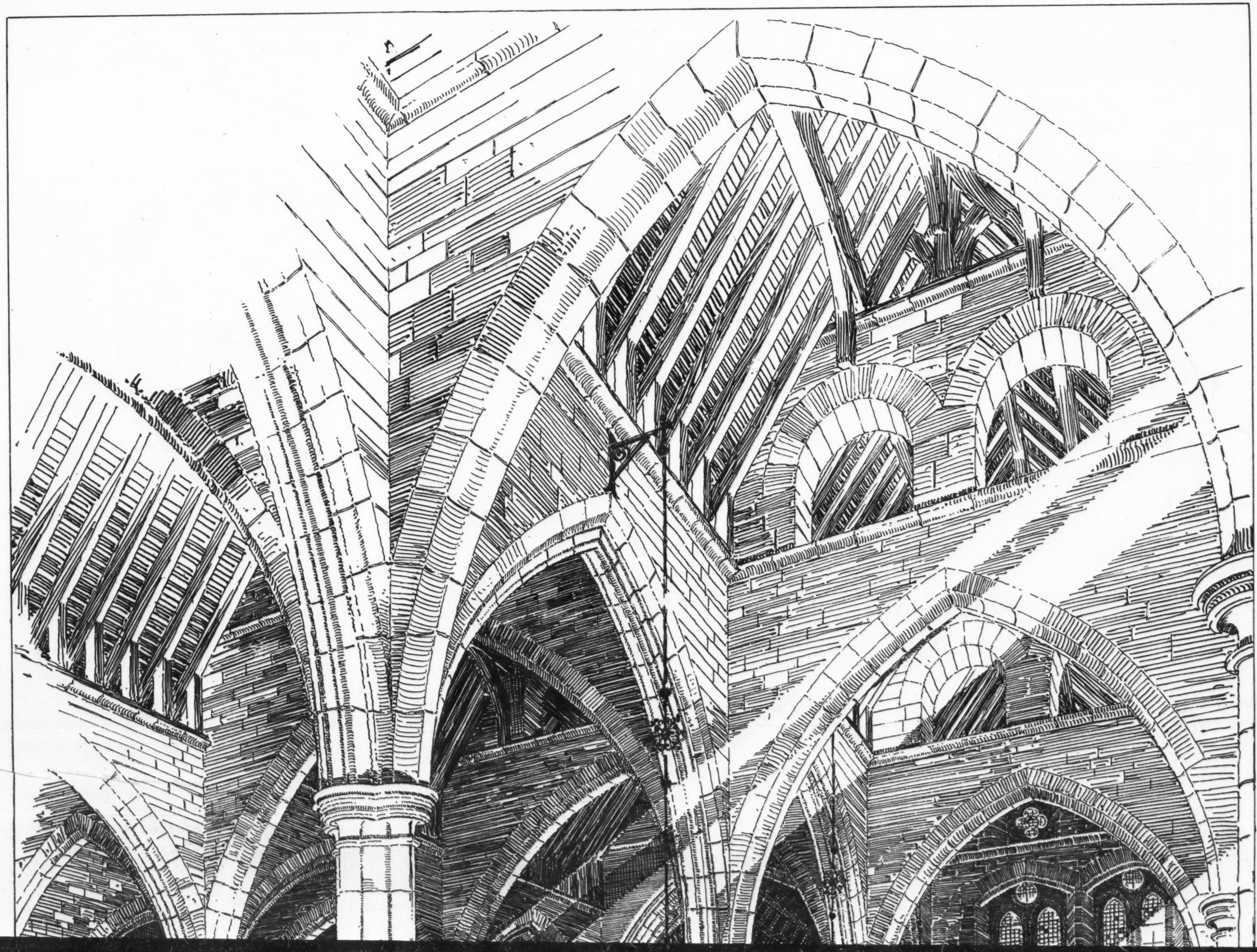

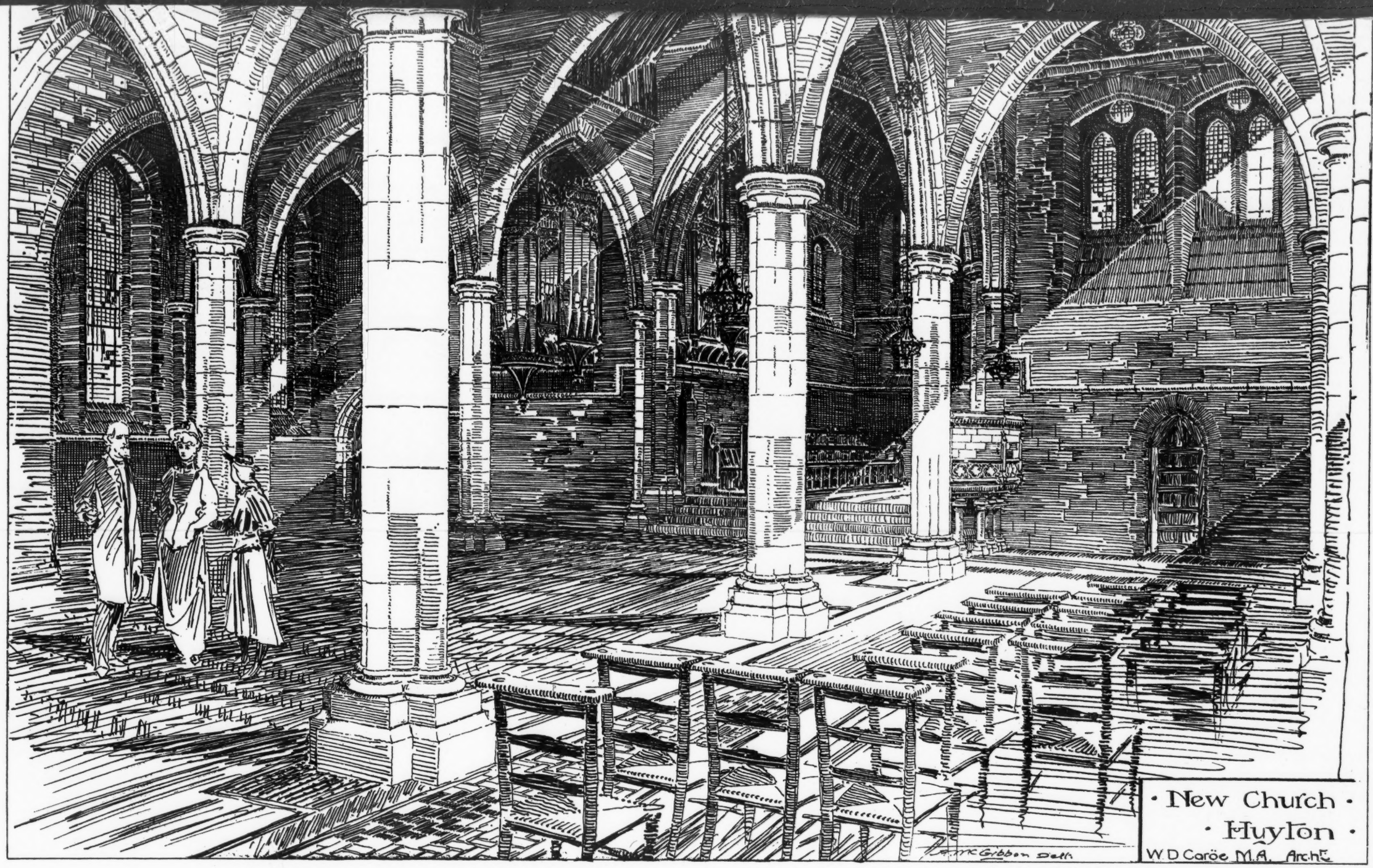

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